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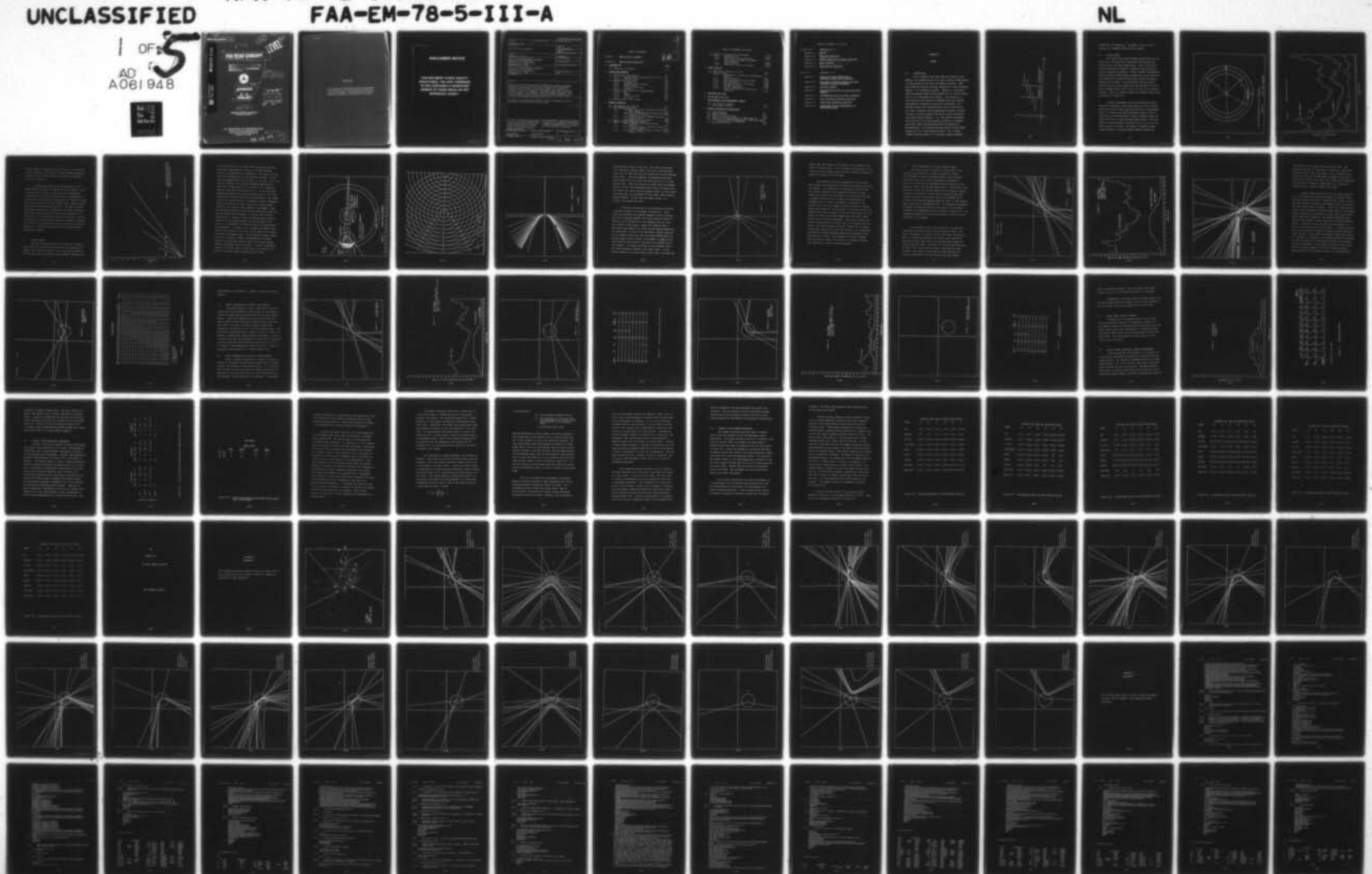

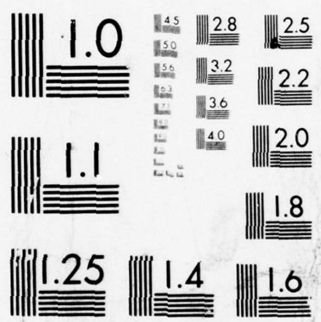

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FAA BCAS CONCEPT.

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Volume IIIA.

APPENDICES

A – E.

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16. Abstract

A unique airborne aircraft collision avoidance system concept is presented which assures adequate separation from the largest possible percentage of potential collision threats. The concept operates in all airspace as a compatible backup to the present and evolving ATC system, and is acceptable to the pilot and the user community. The system concept capitalizes on the aviation community's large existing investment in ATCRBS transponders and on the ground based beacon surveillance system network for the basic sources of the collision avoidance information. The appendices in this volume include:

The report is contained in three volumes; an Executive Summary (I), Concept Description (II) and Appendices (III-A & III-B)

(cont on p. iii)

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APPENDIX A

GARBLE

A.1 INTRODUCTION

In its simplest form radio frequency garble occurs whenever two signals arrive at the same receiver simultaneously or close enough in time that the signals interfere. When the condition persists with many repetitions of the overlapped signals, it is synchronous garble. Figure A-1 illustrates three overlapping replies from aircraft #2, #3, and #4 during one 20.3 μs transponder reply period. This analysis is concerned only with replies on 1090-MHz since the 1030-MHz interrogation frequency is relatively uncluttered. The 1090-MHz replies are omnidirectional from all aircraft in any radar's mainbeam (and nonsuppressed sidelobes) causing the BCAS to receive replies from each aircraft replying to each radar (passive garble). In a low density environment with only one or two interrogation overlaps at a maximum, relatively simple tracking algorithms can separate or "de-interleave," the fourteen discrete pulses of each signal during the 20.3 μs interrogation period. But in dense traffic with more than 5 or 6 overlaps, passive tracking

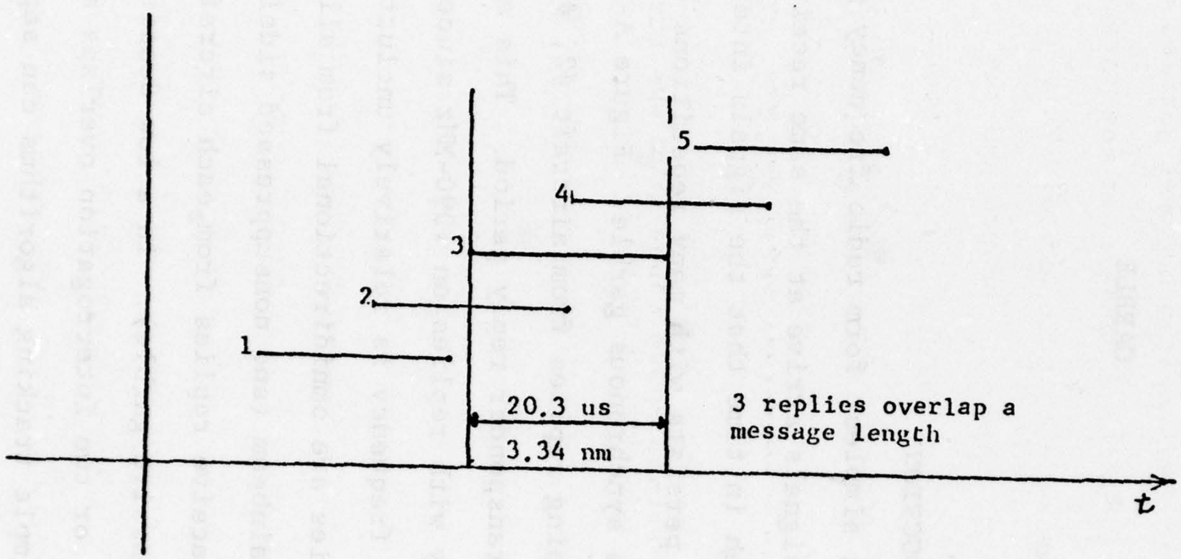


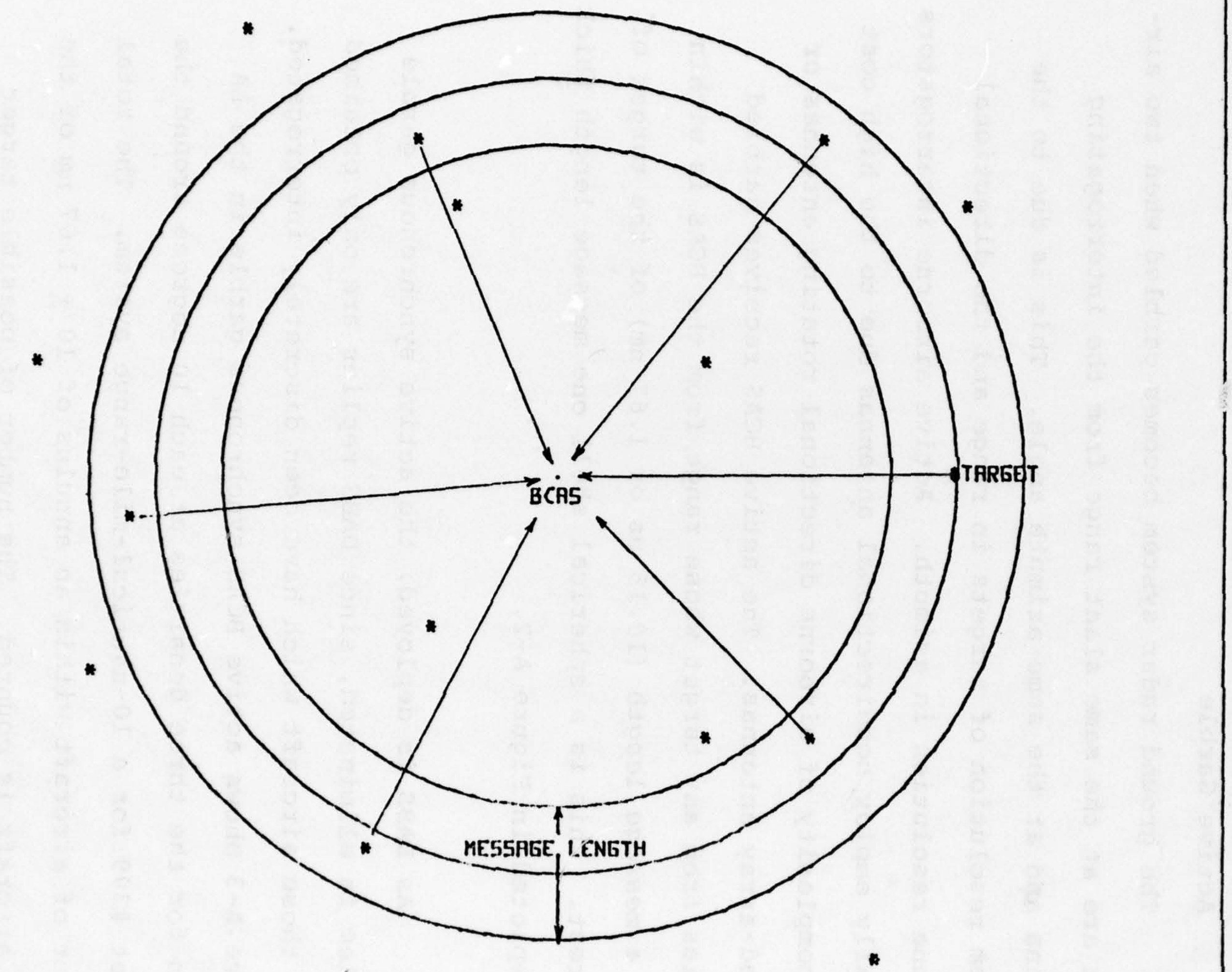
Figure A-1: Garble Phenomenon

becomes next to impossible. The same is true for active tracking at a somewhat higher level of garble.

A.2 Active Garble

The ground radar system becomes garbled when two aircraft are at the same slant range from the interrogating antenna and at the same azimuth angle. This is due to the system resolution of targets in range and the directional antenna resolution in azimuth. Active airborne interrogators normally employ nondirectional antennas due to the high cost and complexity of airborne directional rotating antennas or phased-array antennas. The active BCAS receives garbled replies from any target whose range from the BCAS is within half a message length (10.15 us or 1.67 nm) of the target of interest. This is a spherical shell one message length thick as depicted in Figure A-2.

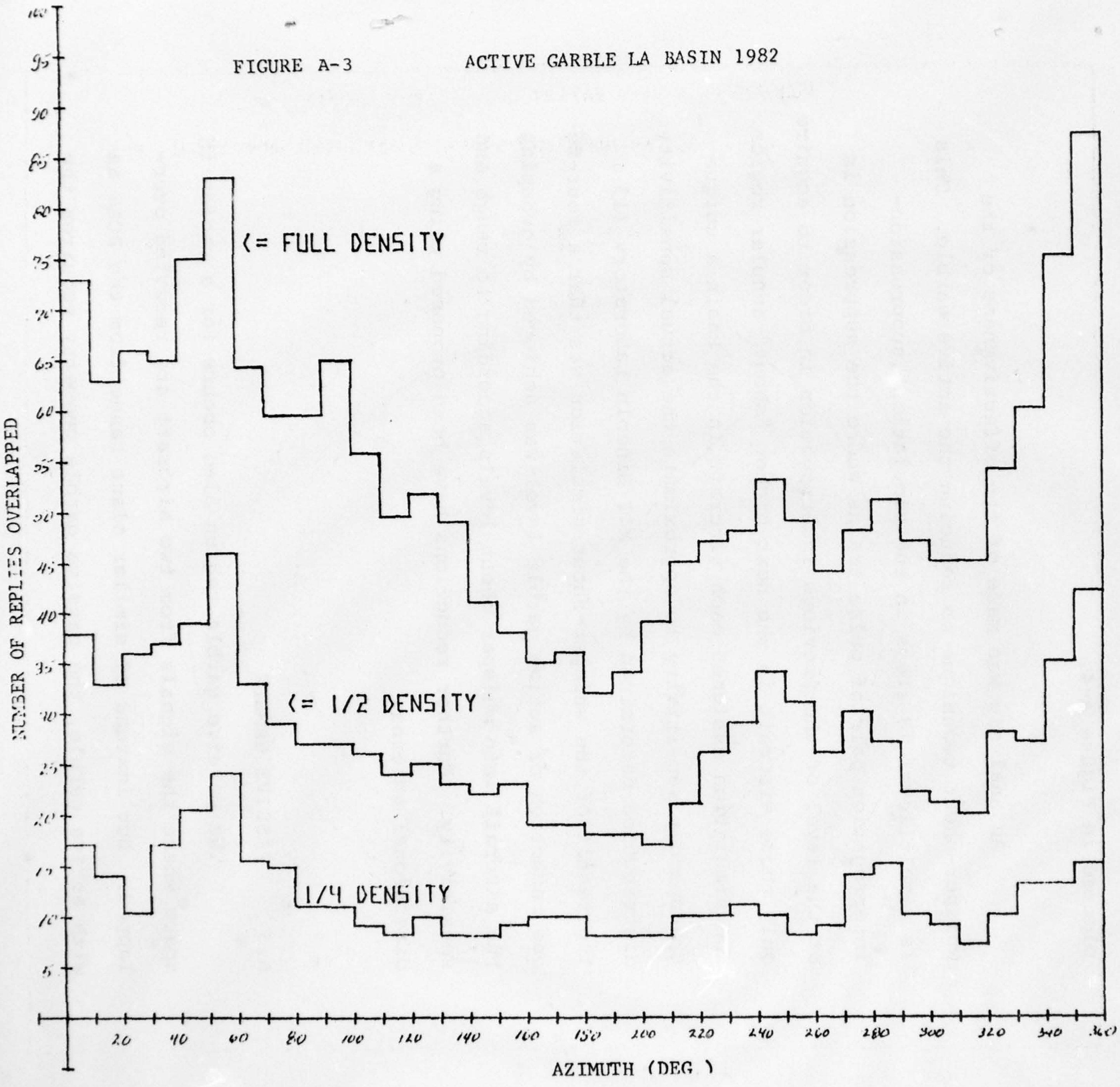
As DABS is deployed, the active synchronous garble problem is eliminated, since DABS replies are only obtained from those aircraft which have been discretely interrogated. Figure A-3 shows active BCAS synchronous garble in the LA Basin for the three densities at each 10 degrees around the target #399 for a 10-nautical-mile-range system. The total number of aircraft within an annulus of 10 $\pm$ 1.67 nm of the BCAS aircraft is counted. The number of possible target tracks required to continue proper tracking through the



5 REPLIES OVERLAP TARGET REPLY TO BCAS INTERROGATION

FIGURE A-2 ACTIVE GARBLE PHENOMENON

FIGURE A-3 ACTIVE GARBLE LA BASIN 1982



maximum number of overlaps was plotted for 5, 10, 15 and 20 nm active systems. An average of these maximum overlaps was determined for different numbers of tracks, and this was plotted in Figure A-4.

An analysis was made of the effectiveness of the whisper-shout technique on reducing the active garble. This is a multilevel (8 steps in the simulation) suppression-interrogation pair of pulse trains where the suppression is at the level of the previous interrogation in order to acquire only those aircraft in the next higher "shout" annular region. The simulation assigned each aircraft in the Basin a unique transponder sensitivity to approximate the actual sensitivity distribution determined by the MIT Lincoln Laboratory (13). The result of the whisper-shout simulation was that a four-to-one reduction of active garble level was achieved by grouping the aircraft into whisper shout levels according to range and sensitivity. Further reductions have been proposed using a directional antenna.

A.3 PASSIVE GARBLE

The passive garble region also occurs for a region in space where the signals from two aircraft are recevied overlapped. But instead of similar slant range from the BCAS as with active garble, the passive garble geometry requires the

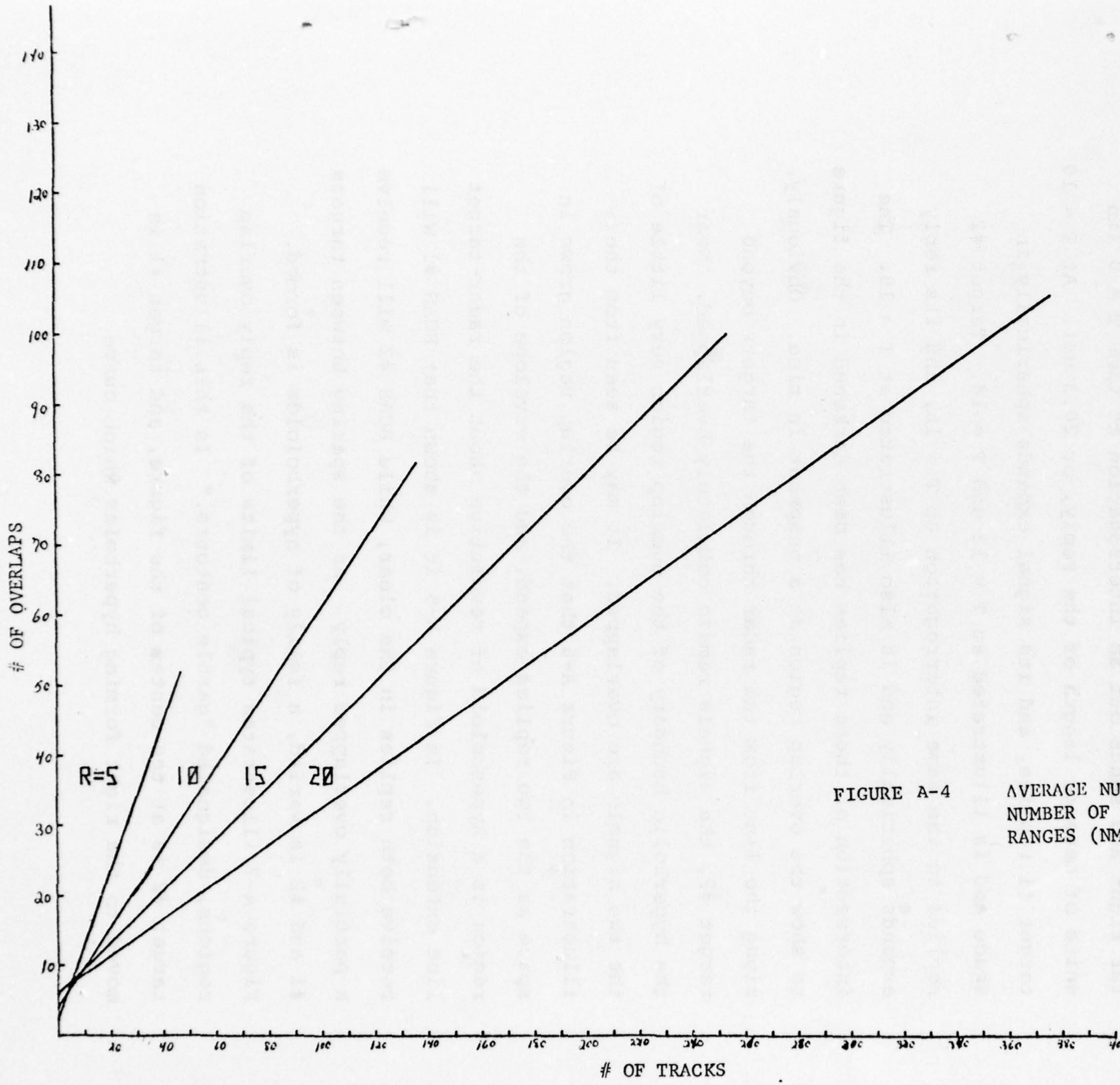


FIGURE A-4 AVERAGE NUMBER OF OVERLAPS VS. NUMBER OF TRACKS FOR VARIOUS RANGES (NM) ACTIVE MODE

two aircraft to be in the same ground radar main beam and have equal reply times of arrival at the BCAS aircraft. Figure A-5 illustrates this phenomenon. The radar is at the far right and sends out an interrogation at time T = 0 (in units of message length of the reply, or 20.3 us). At T = 10 target #1 replies, and its signal expands spherically in space and is illustrated at T = 12 and T = 18. Target #2 replies to the same interrogation at T = 16, and its reply expands spherically and is also illustrated at T = 18. The intersection of these replies has been darkened in the figure to show the overlap region at a snapshot in time. Obviously, along the line from the radar through the targets beyond target #2, the signals remain completely overlapped. Near the hyperbolic boundary of the overlap region very little of the two signals are overlapped. It may be seen from the illustration in Figure A-6 that the overlap region grows in space as the two replies expand, and the envelope of the region is a hyperboloid of revolution about the radar-target line extension. In Figure A-5 it is shown that BCAS #1 will receive both replies in the clear, while BCAS #2 will receive a partially overlapped reply. As the spacing between targets #1 and #2 is varied, a family of hyperboloids is formed. Figure A-7 illustrates typical limits of the reply overlap regions, designated "garble contours." In this illustration target #2 is at the center of the figure, and target #1 is moved to the right forming hyperbolas which curve

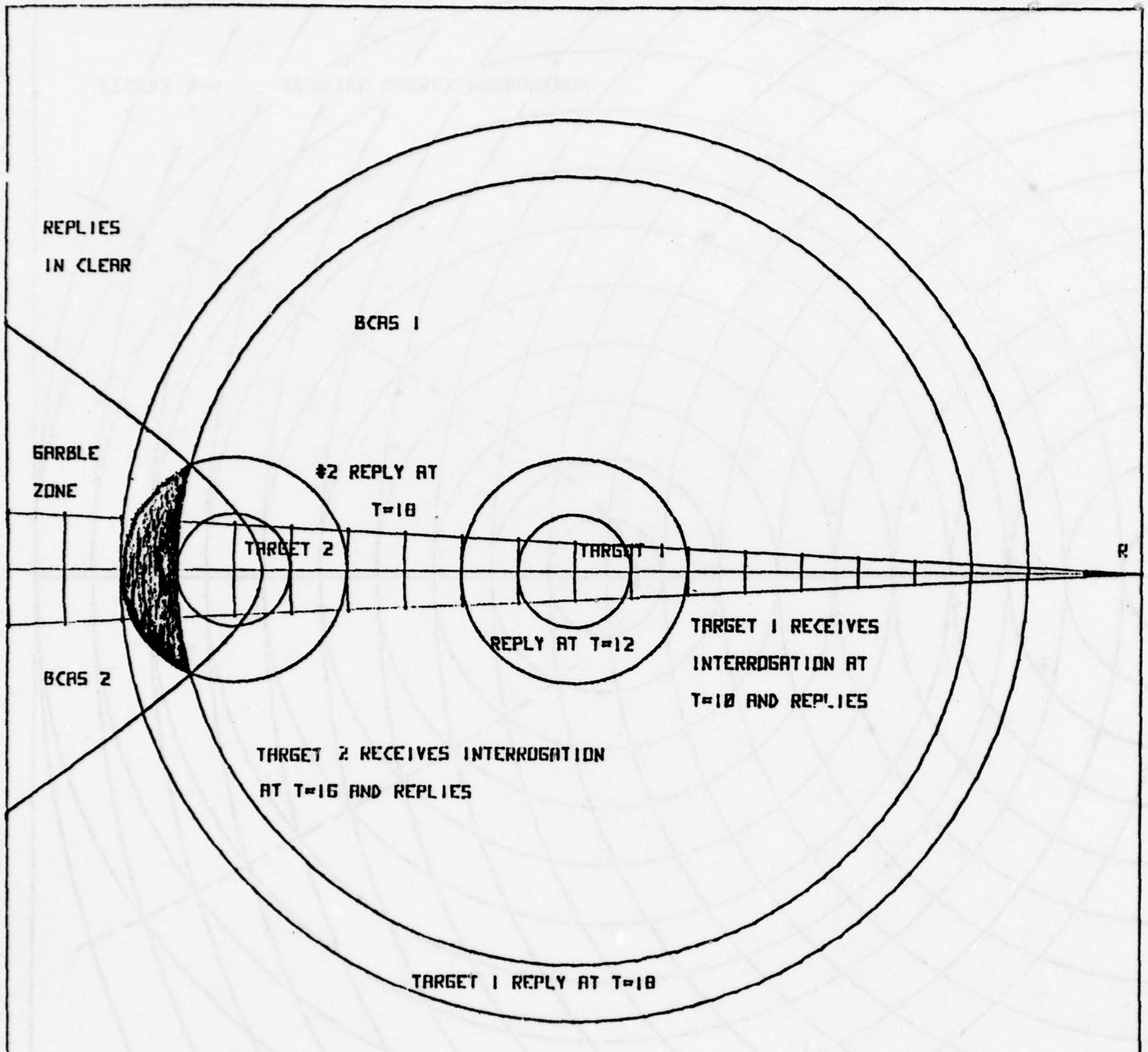


FIGURE A-5 PASSIVE GARBLE PHENOMENON

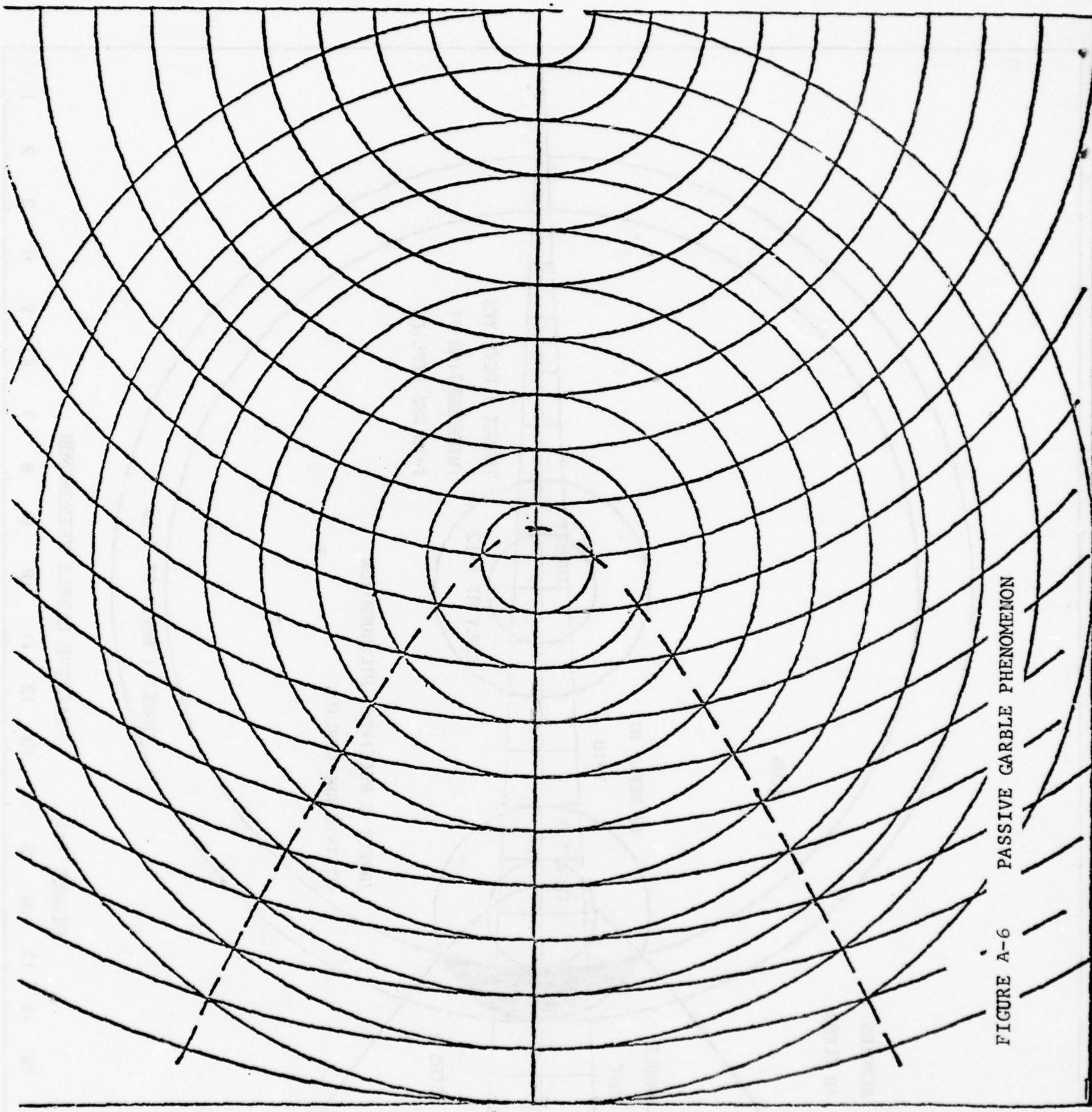


FIGURE A-6 PASSIVE GARBLE PHENOMENON

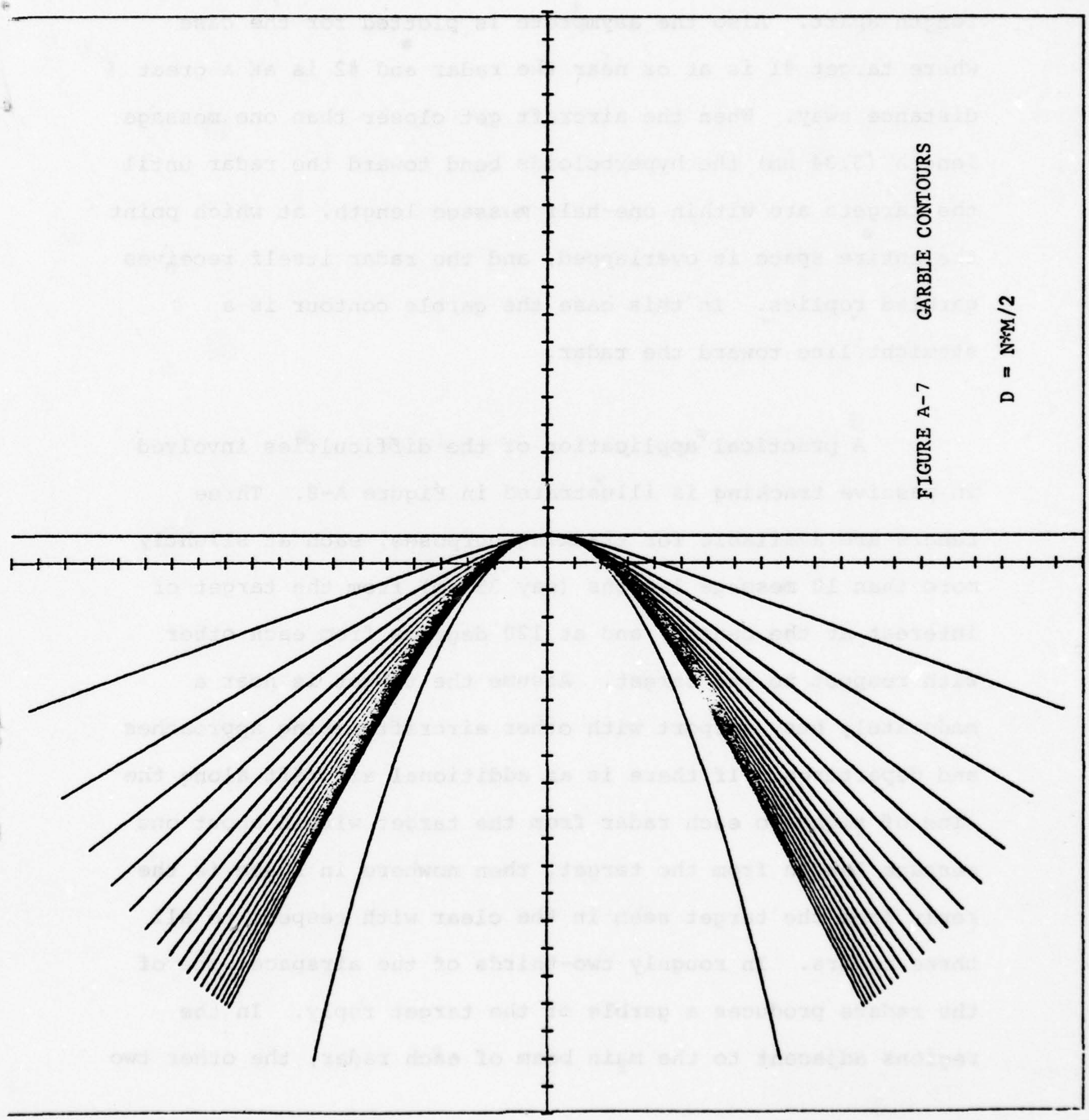


FIGURE A-7 GARBLE CONTOURS

D = N*M/2

progressively further to the left. Note that the vertical line represents a garble region (the entire left-hand half space) for the case where the two targets are one full message length apart. Also the asymptote is plotted for the case where target #1 is at or near the radar and #2 is at a great distance away. When the aircraft get closer than one message length (3.34 nm) the hyperboloids bend toward the radar until the targets are within one-half message length, at which point the entire space is overlapped, and the radar itself receives garbled replies. In this case the garble contour is a straight line toward the radar.

A practical application of the difficulties involved in passive tracking is illustrated in Figure A-8. Three radars are available for tracking purposes, each at slightly more than 10 message lengths (say 35 nm) from the target of interest at the center, and at 120 degrees from each other with respect to the target. Assume the target is near a moderately busy airport with other aircraft making approaches and departures. If there is an additional aircraft along the line of sight to each radar from the target within about one message length from the target, then nowhere in space is the reply from the target seen in the clear with respect to all three radars. In roughly two-thirds of the airspace, one of the radars produces a garble of the target reply. In the regions adjacent to the main beam of each radar, the other two

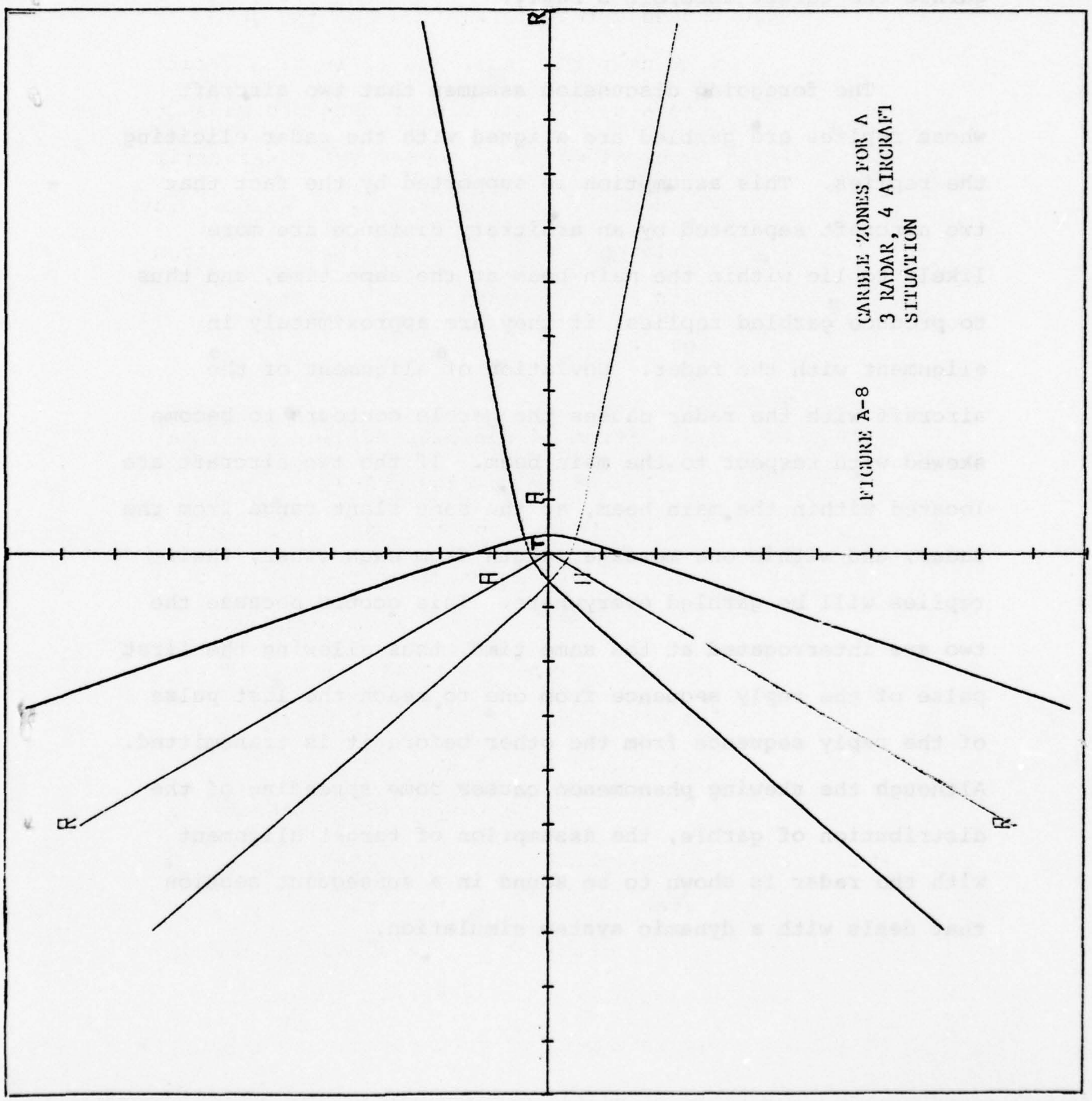


FIGURE A-8
GARBLE ZONES FOR A
3 RADAR, 4 AIRCRAFT
SITUATION

radars cause the replies of the target to be garbled by aircraft in the main beam. And in the small area adjacent to the target, all three radars cause the other aircraft's replies to garble the target aircraft's reply.

The foregoing discussion assumes that two aircraft whose replies are garbled are aligned with the radar eliciting the replies. This assumption is supported by the fact that two aircraft separated by an arbitrary distance are more likely to lie within the main beam at the same time, and thus to produce garbled replies, if they are approximately in alignment with the radar. Deviation of alignment of the aircraft with the radar causes the garble contours to become skewed with respect to the main beam. If the two aircraft are located within the main beam, at the same slant range from the radar, and within one message length from each other, their replies will be garbled everywhere. This occurs because the two are interrogated at the same time, thus allowing the first pulse of the reply sequence from one to reach the last pulse of the reply sequence from the other before it is transmitted. Although the skewing phenomenon causes some spreading of the distribution of garble, the assumption of target alignment with the radar is shown to be sound in a subsequent section that deals with a dynamic system simulation.

A.4 STATIC SIMULATION OF LA BASIN PASSIVE GARBLE

The passive garble contours for target #399 in the LA Basin were plotted with respect to each of 9 radars (LAX, Burbank, El Toro, Long Beach, March, Norton, Ontario, San Pedro, Santa Ana) and are contained in Attachment I. Figure A-9 is the plot of hyperbolic overlap regions for the LAX radar (ASR-7) for the full 1982 density. Each contour line indicates a target in the main beam with #399 causing a region in space to be garbled. In the sector toward the LAX radar (toward the center of the axes) there are 5 overlaps due to targets within one half message length of #399. In the opposite sector there are 19 overlaps of #399. An azimuthal distribution of passive overlaps was derived from Figure A-9 and plotted alongside the corresponding active overlaps in Figure A-10. For comparative purposes the active BCAS garble is seen to be four times that of the passive.

The LAX radar is only 20 nm from #399, and therefore relatively few aircraft share the main beam with #399. The radar interrogator at Ontario, on the other hand, causes somewhat of a worst-case condition for garble, being some 50 nm away and with many more targets in the beam width capable of garbling aircraft #399. The symbol "R" on the right hand side of Figure A-11, just above the x-axis, indicates the radar location. The points in line with the radar and #399 are targets illuminated by the main beam as the radar sweeps

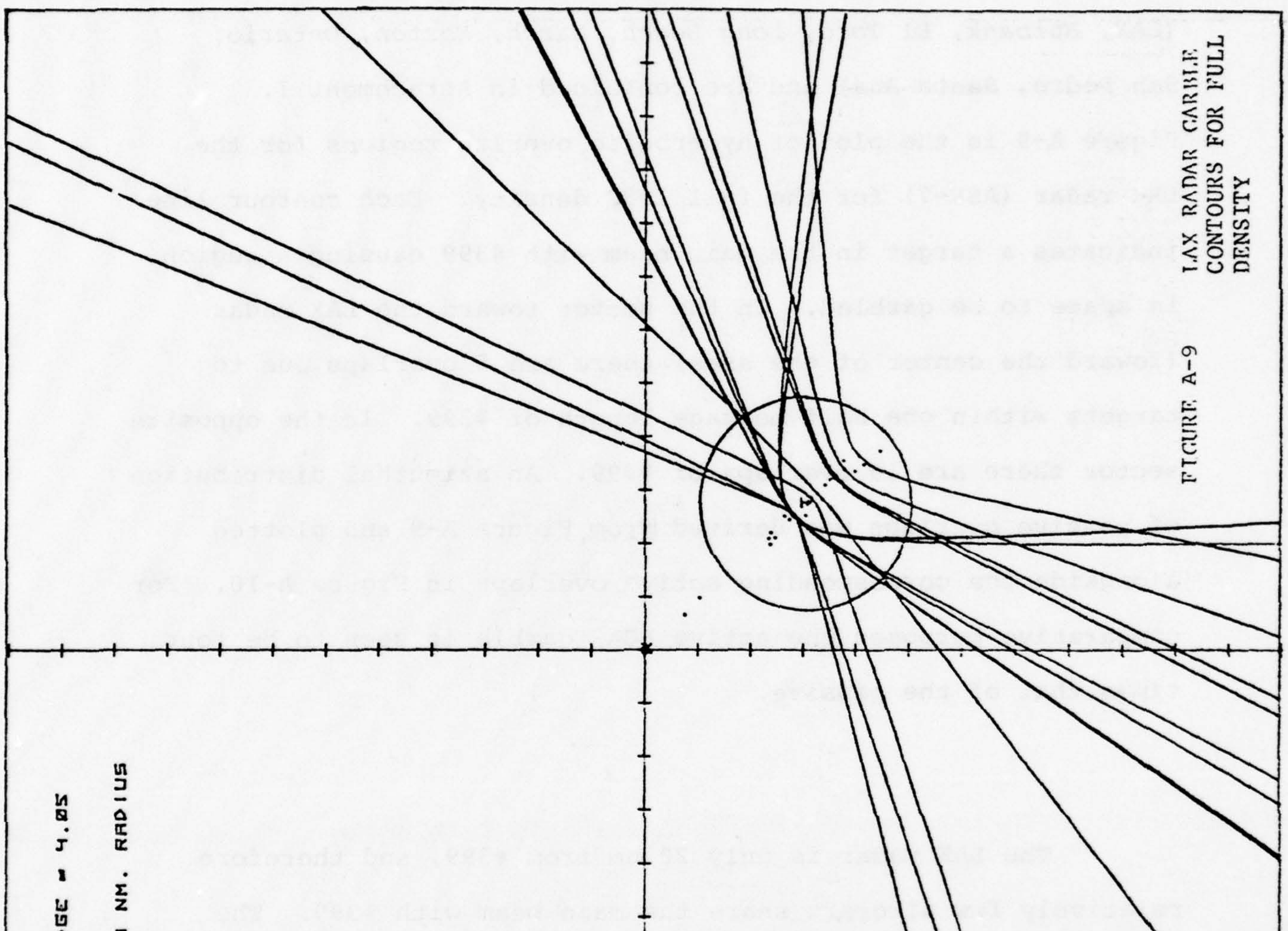


FIGURE A-9
LAX RADAR GARBLE CONTOURS FOR FULL DENSITY

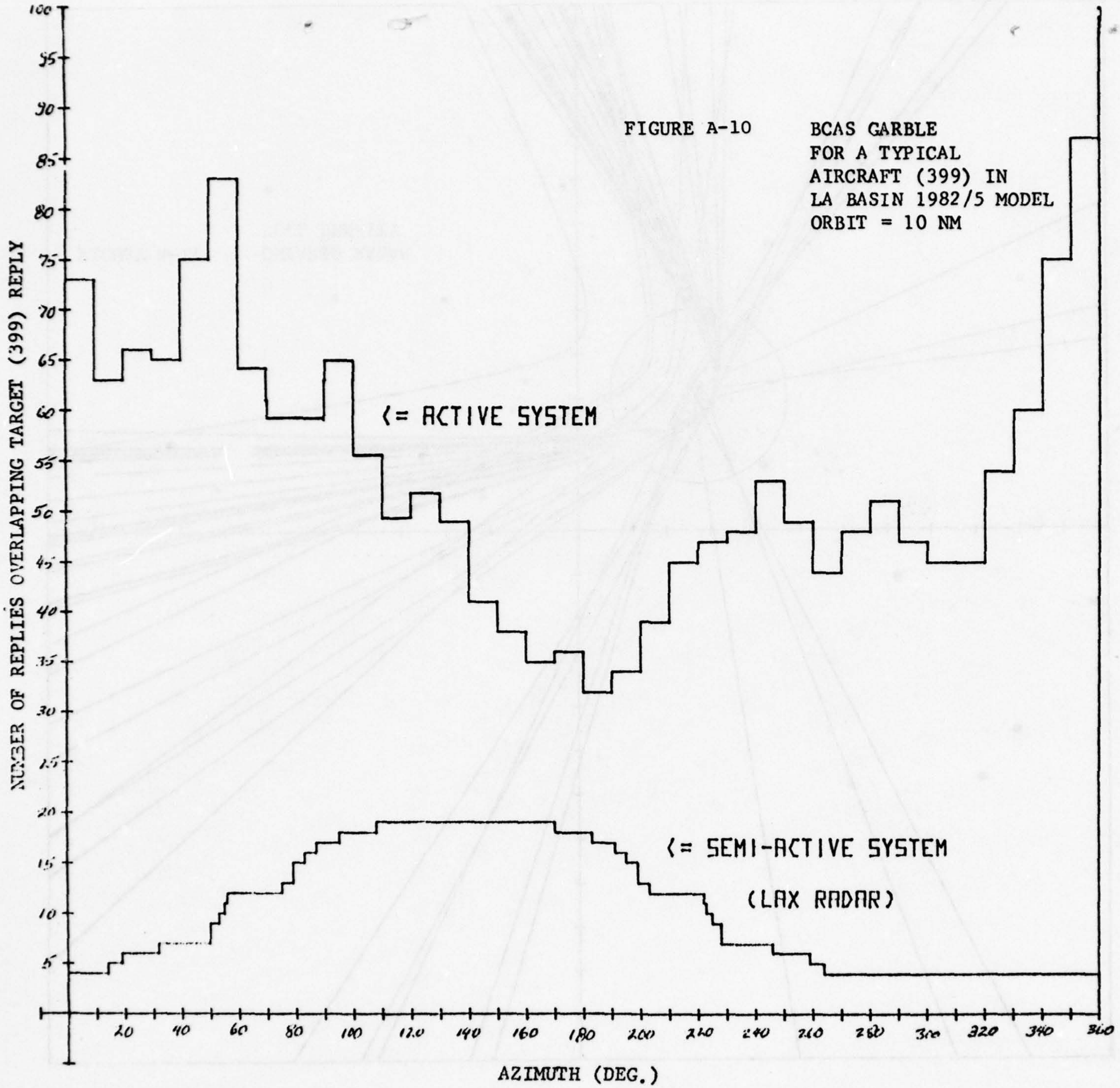


FIGURE A-10 BCAS GARBLE FOR A TYPICAL AIRCRAFT (399) IN LA BASIN 1982/5 MODEL ORBIT = 10 NM

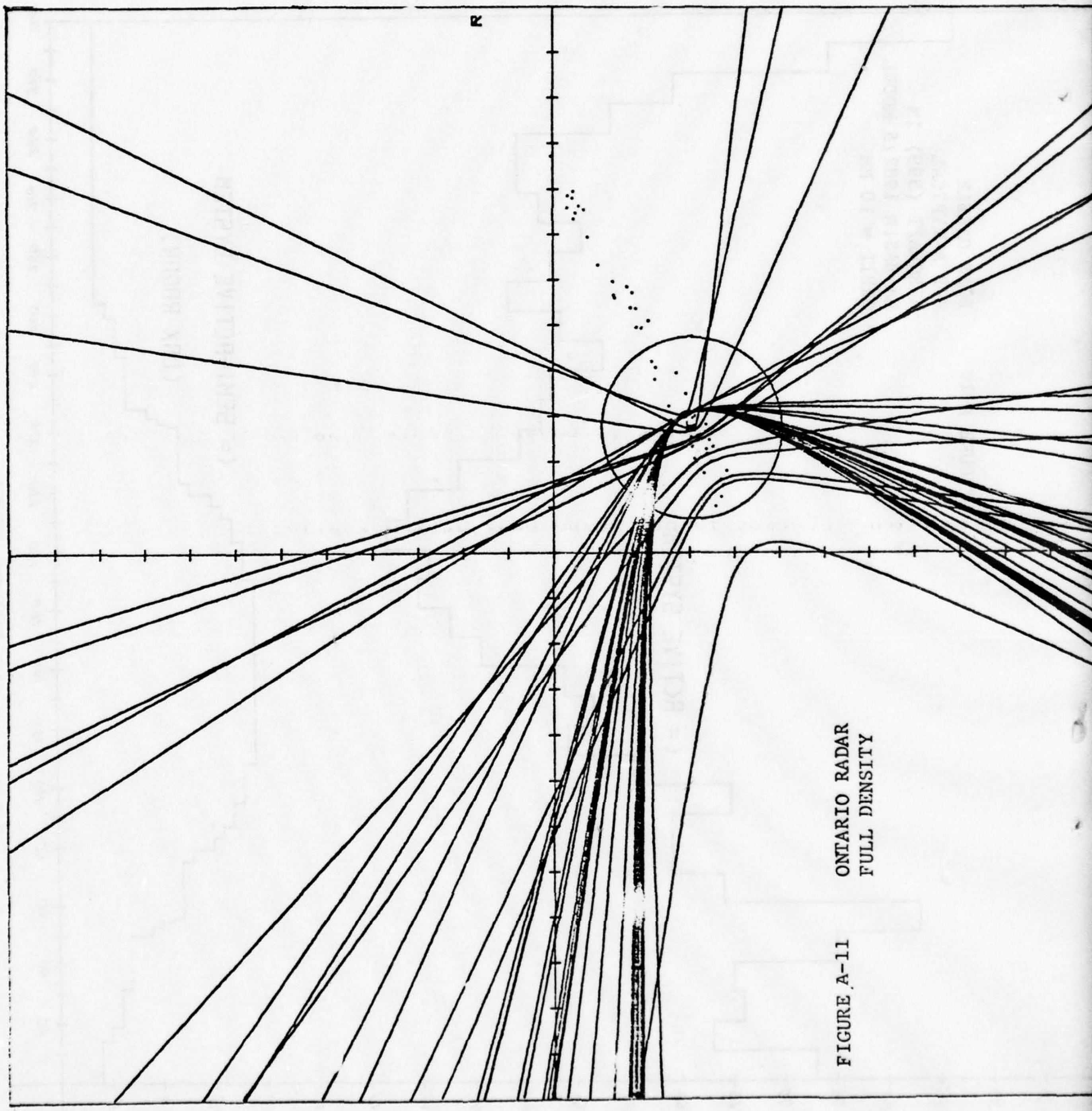


FIGURE A-11 ONTARIO RADAR FULL DENSITY

past #399 with the 4-degree beam centered on #399. The opposite situation is illustrated in Figure A-12; where the Long Beach ASR is very close (about 8 nm), the beam has not spread very far, and the data show no garbles on the north side and only three on the south side. This may be contrasted with Figure A-11 (Ontario), where there are 9 overlaps at minimum and 47 at maximum (opposite the radar).

A sweep-by-sweep analysis of the Long Beach radar was used to determine the overlap environment for aircraft #399. The sweep analysis was used to determine how an actual environment may interact in producing overlapping replies in space as the interrogator scans in azimuth. Figure A-13 summarizes the output of the program as it scanned target #399 by 0.225-degree sweeps (simulating a four-second rotation rate and 400 pulse/second repetition frequency). The program determines which aircraft cause garble to target #399 and which cause potential garble. A maximum of eight aircraft replied together, and three had overlaps causing serious garble. It should be noted that if the system were capable of reading through three overlapped replies, it would have centermarked target #399 correctly. Although it is probable that passive systems will degarble the three overlaps in the Long Beach situation, this information may be unusable, as the radar is too close to the target (rapidly changing geometry) and BCAS for smooth tracking. Additional plots of the garble contours of the other radars

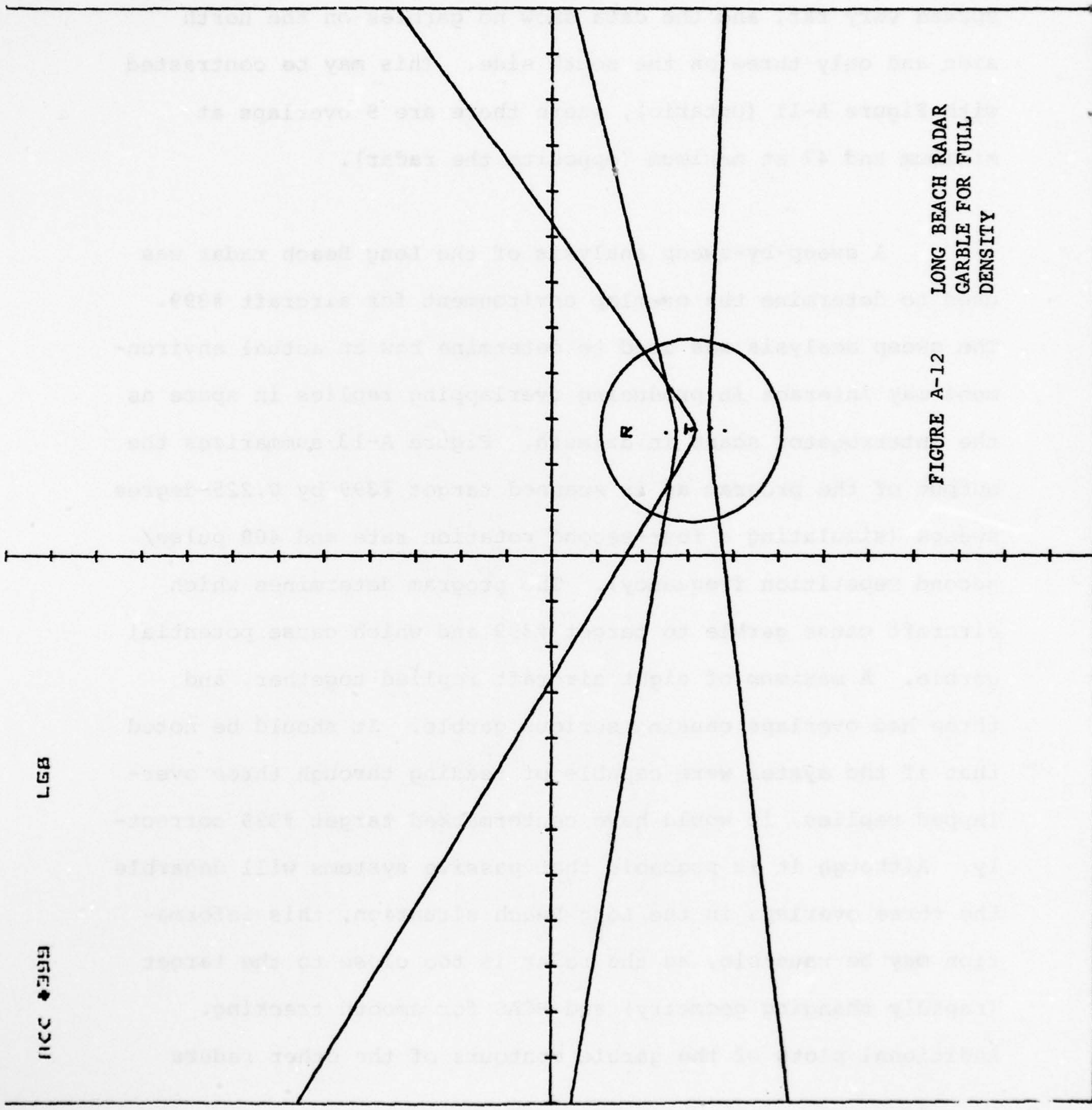


FIGURE A-12
LONG BEACH RADAR
GARBLE FOR FULL
DENSITY

LONG BEACH RADAR

SWEEP #	389	390	393	394	395	396	398	399	400	401	402	431	# OF TGT OVERLAPS	# OF AIRCRAFT
1							G	G	G	P	P		2	5
2							G	G	G	P	P		2	5
3							G	G	G	P	P		2	5
4							G	G	G	P			2	4
5						G	G	G	G	P		P	3	6
6						G	G	G	G	P		P	3	6
7						G	G	G	G	P		P	3	6
8					P	G	G	G	G	P		P	3	7
9					P	G	G	G	G	P		P	3	7
10					P	G	G	G		P		P	2	6
11				P	P	G	G	G		P		P	2	7
12				P	P	G	G	G		P		P	2	7
13				P	P	G	G			P		P	1	6
14				P	P	G	G			P		P	1	6
15				P	P	G	G					P	1	5
16			P	P	P	G	G					P	1	6
17			P	P	P	G	G					P	1	6
18	P	P	P	P	P	G	G					P	1	8
19	P	P	P	P	P	G	G					P	1	8

G = GARBLE EVERYWHERE
P = POTENTIAL GARBLE
H = CLEAR REPLY

FIGURE A-13 LONG BEACH RADAR PASSIVE GARBLE WEDGER OUTPUT

are presented in Attachment 1 in order of decreasing target density.

A.5 STATIC SIMULATION OF LA BASIN, HALF DENSITY

An analysis similar to that in Section A.3 was conducted using the half-density traffic model of 382 targets. Figure A-14 shows that the garble contours have been roughly halved. Figure A-15 compares the active and passive half-density garble levels for various azimuth angles around aircraft #399. The ratio of active to passive garble has remained at the same 4-to-1 as in the full-density model. The half-density Long Beach garble contour is given in Figure A-16, showing a significantly improved garble environment. But now a tracker that uses only information "in the clear" (ungarbled) as being positively identified would cause cause an error of 0.5 degree in centermarking the azimuth to #399. Figure A-17 summarizes program output on a sweep-by-sweep basis.

A.6 STATIC SIMULATION OF LA BASIN, QUARTER DENSITY

Again, a complete analysis as in Section A.3 was conducted for the quarter-density traffic model with 177 targets. Figures A-18 through A-21 show these results. It is significant to point out that once again the garble environment has improved for the Long Beach radar, yet the centermark error has worsened, further degrading its usefulness. A one-degree

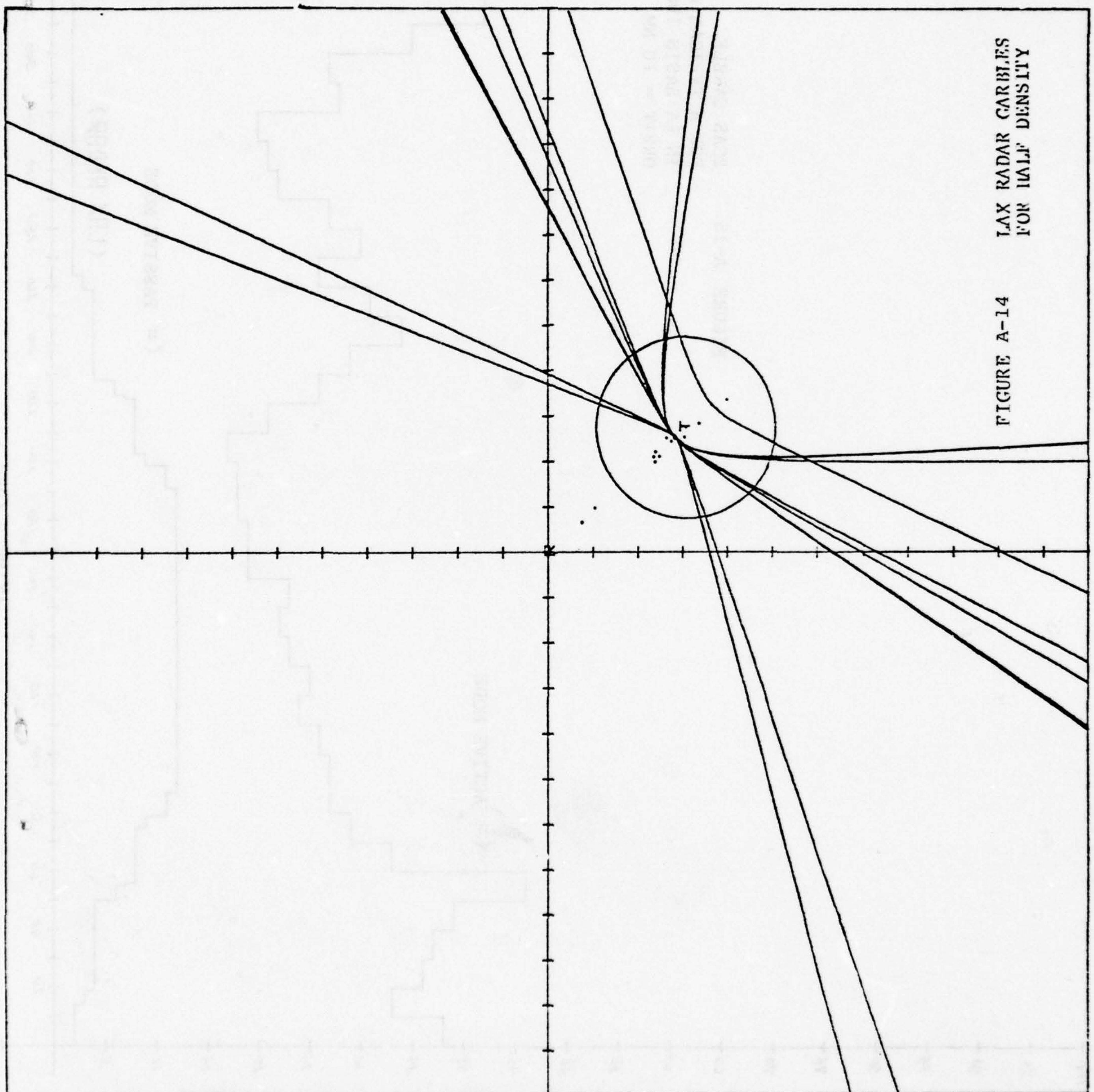


FIGURE A-14 LAX RADAR CARBLES FOR HALF DENSITY

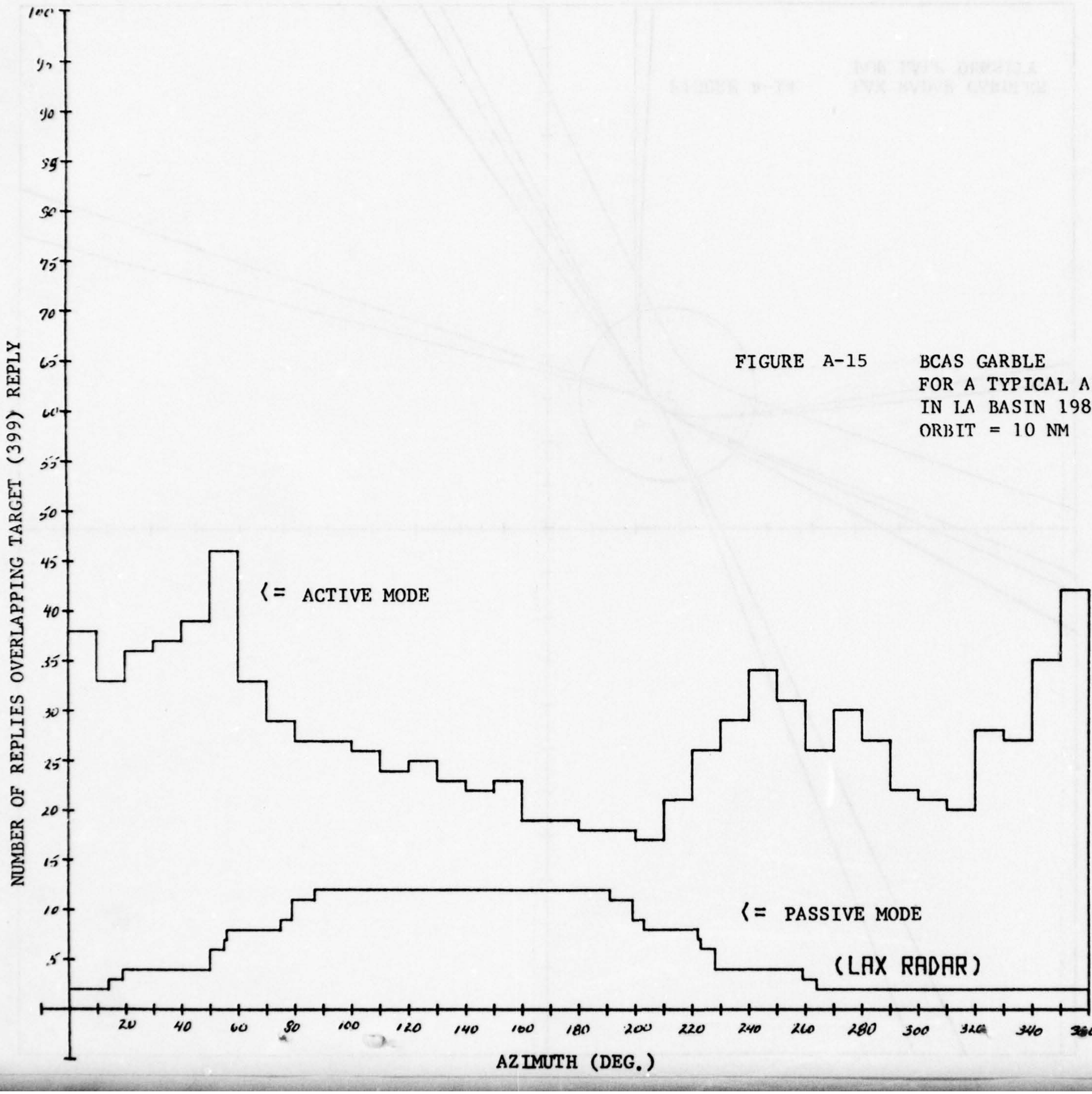


FIGURE A-15 BCAS GARBLE
FOR A TYPICAL AIRCRAFT (399)
IN LA BASIN 1982/5 MODEL (1/2 DENSITY)
ORBIT = 10 NM

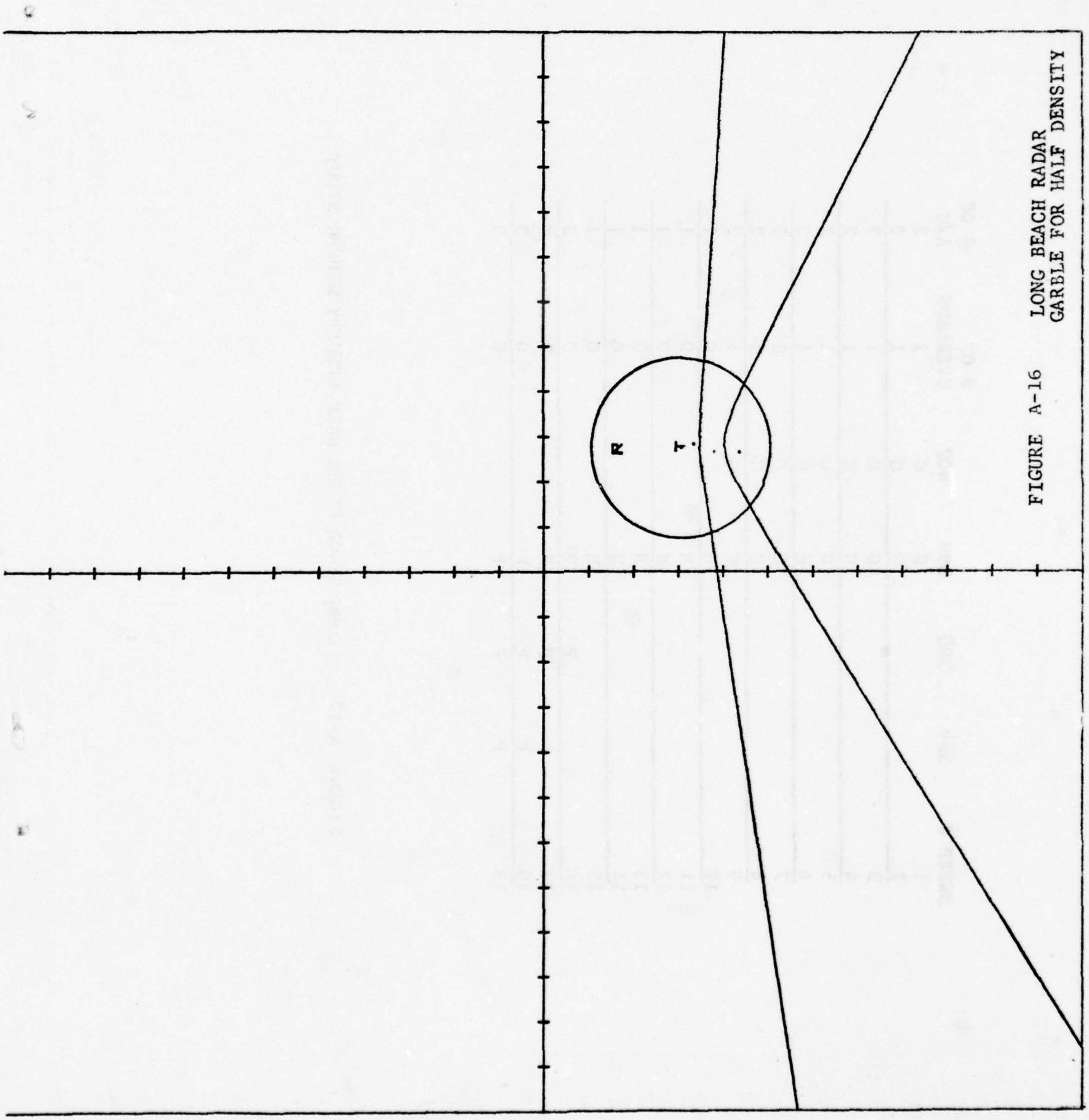


FIGURE A-16 LONG BEACH RADAR
GARBLE FOR HALF DENSITY

SWEEP #	389	390	399	402	# OF OVERLAPS	# OF A/C
1			G	G	1	2
2			G	G	1	2
3			G	G	1	2
4			G	G	1	2
5			G	G	1	2
6			G	G	1	2
7			G	G	1	2
8			G	G	1	2
9			G	G	1	2
10			H		0	1
11			H		0	1
12			H		0	1
13			H		0	1
14			H		0	1
15			H		0	1
16		P	P		0	2
17		P	P		0	2
18	P	P	P		0	3
19	P	P	P		0	3

FIGURE A-17 LONG BEACH RADAR HALF DENSITY WEDGER STUDY

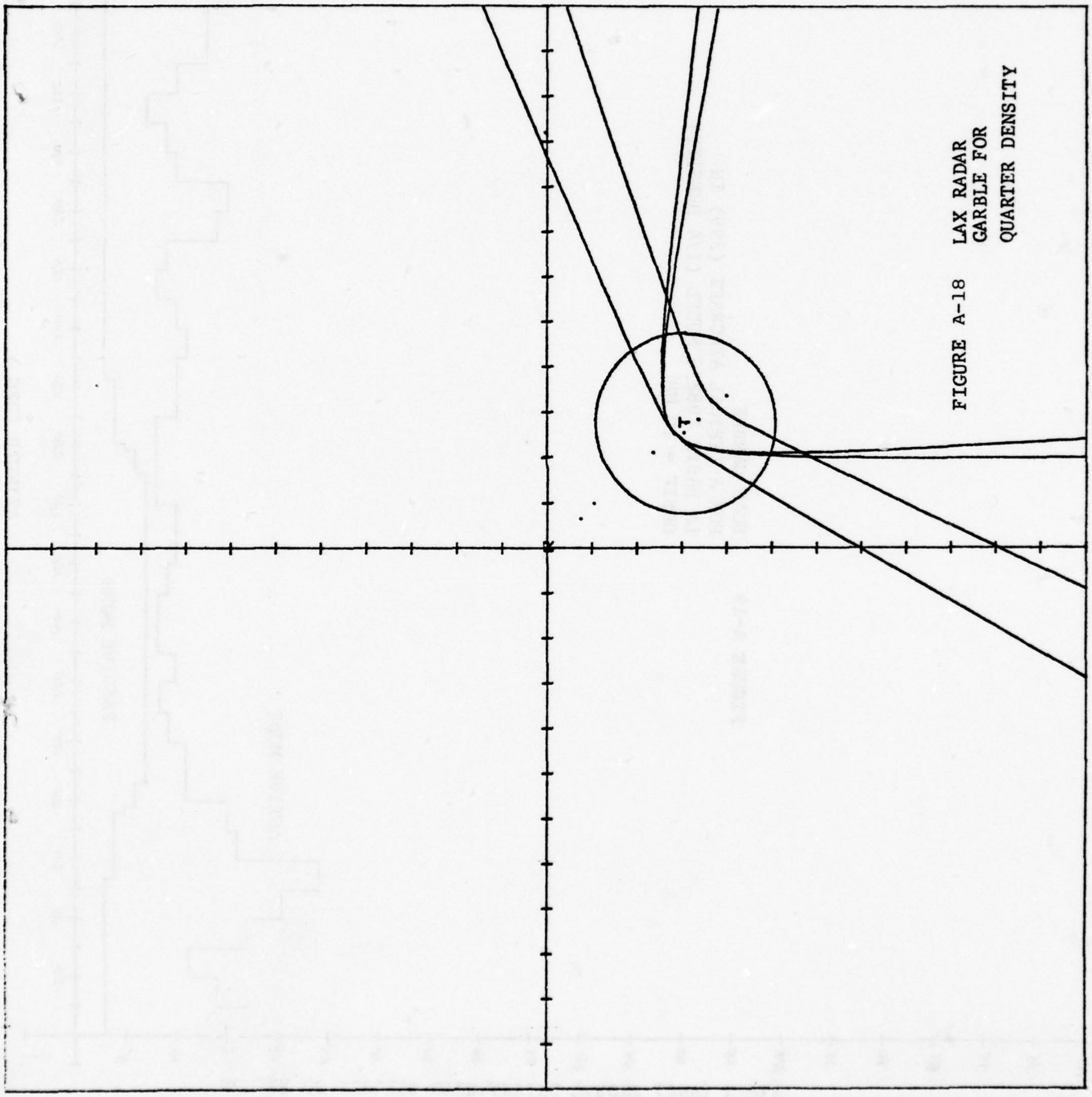


FIGURE A-18 LAX RADAR GARBLE FOR QUARTER DENSITY

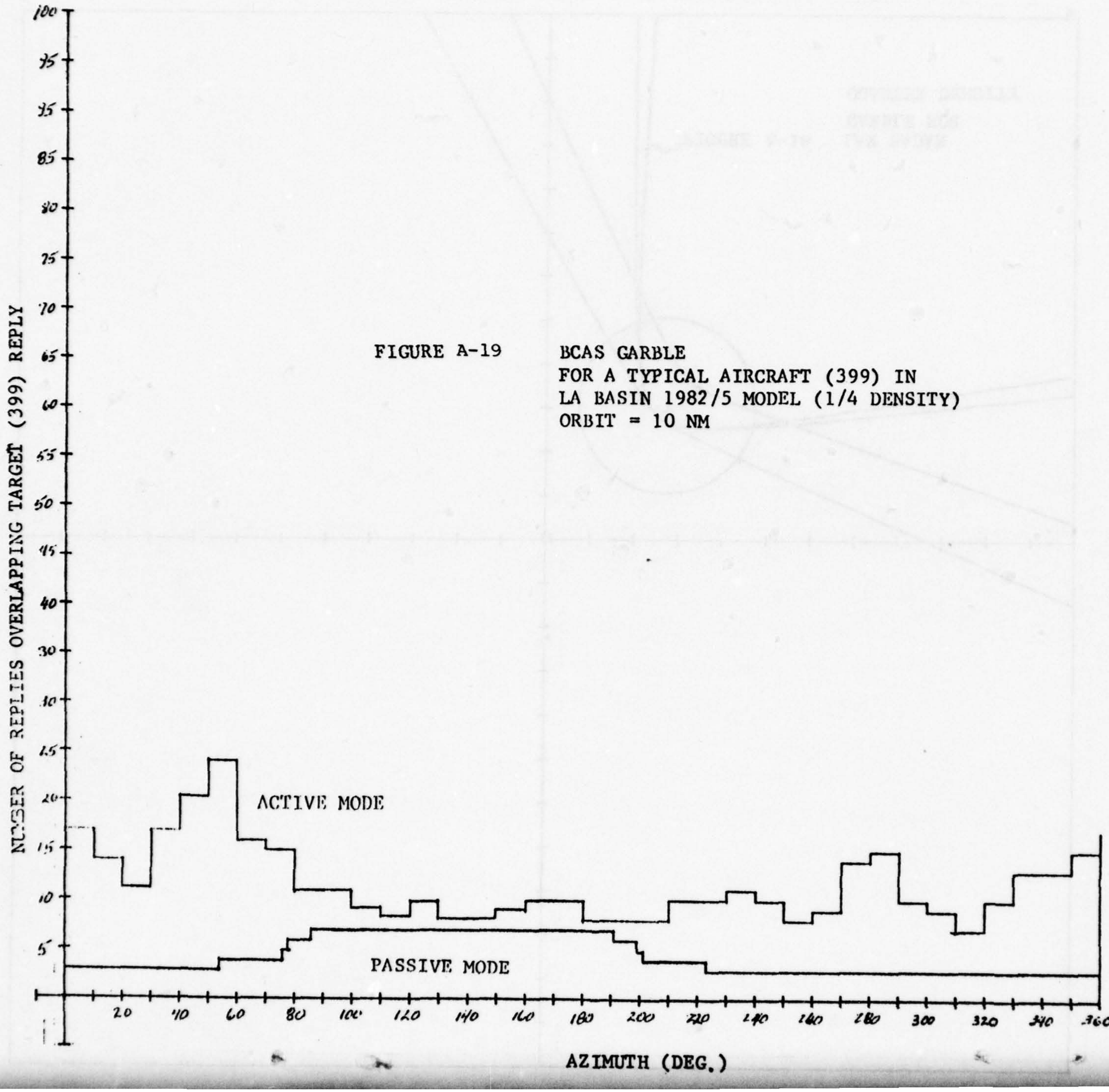


FIGURE A-19 BCAS GARBLE
FOR A TYPICAL AIRCRAFT (399) IN
LA BASIN 1982/5 MODEL (1/4 DENSITY)
ORBIT = 10 NM

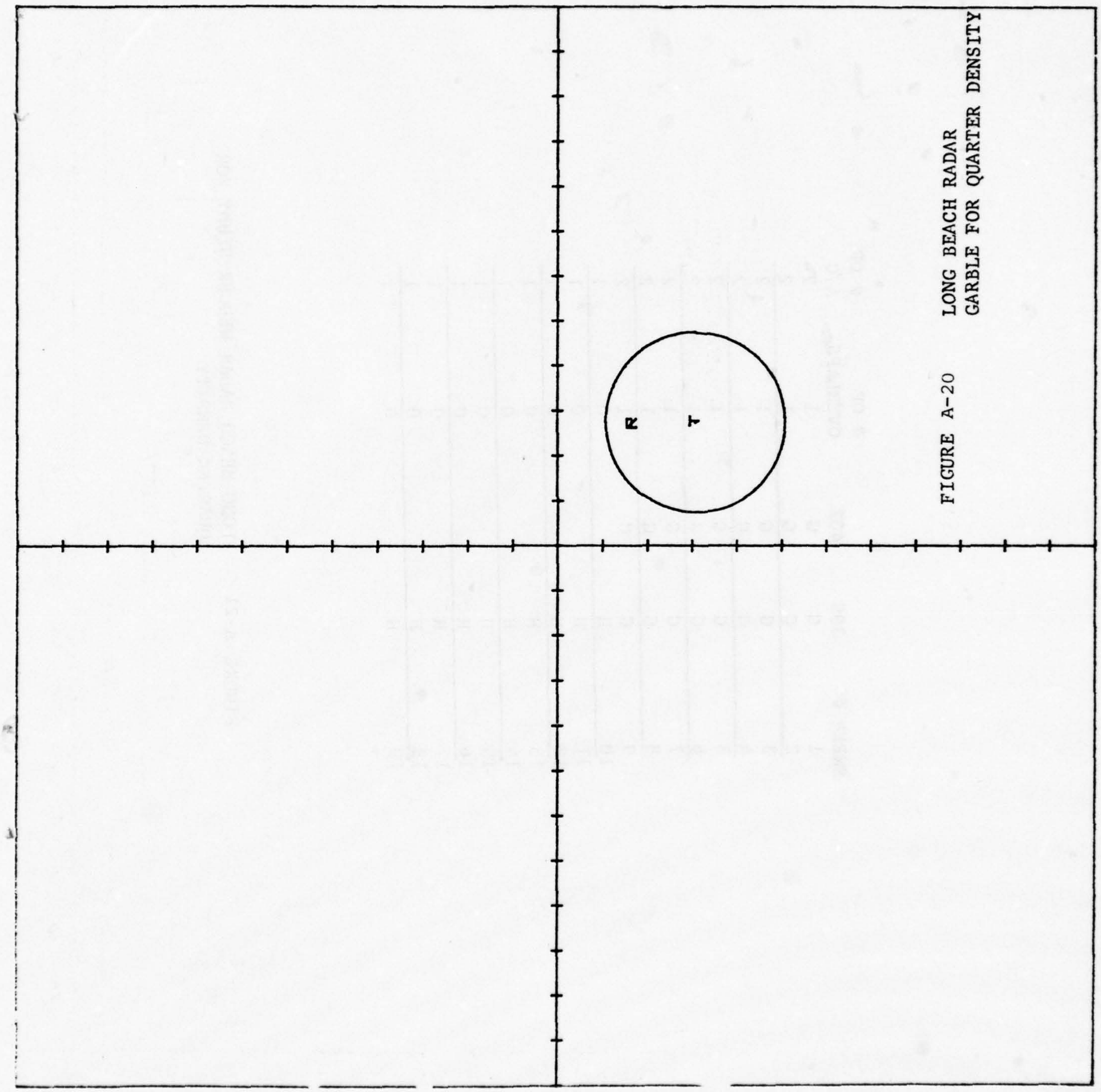


FIGURE A-20 LONG BEACH RADAR GARBLE FOR QUARTER DENSITY

SWEEP #	399	402	# OF OVERLAPS	# OF A/C
1	G	G	1	2
2	G	G	1	2
3	G	G	1	2
4	G	G	1	2
5	G	G	1	2
6	G	G	1	2
7	G	G	1	2
8	G	G	1	2
9	G	G	1	2
10	H		0	1
11	H		0	1
12	H		0	1
13	H		0	1
14	H		0	1
15	H		0	1
16	H		0	1
17	H		0	1
18	H		0	1
19	H		0	1

FIGURE A-21 LONG BEACH RADAR WEDGER STUDY FOR QUARTER DENSITY

error in azimuth now exists. This can cause threat range errors of up to 0.5 nm and bearing errors of 1.1 degrees.

A comparison of the three levels of passive garble for the three model densities is shown in Figure A-22, indicating how the traffic varies with azimuth from aircraft #399.

A.7 STATIC GARBLE ANALYSIS SUMMARY

A compilation of the garble analysis of each radar for the three model densities is presented in Figure A-23. The numbers indicate the maximum passive garble level for each radar, which almost never corresponds to a maximum position for another radar unless they are approximately aligned with target #399. The active garble for each density is also given in the last column.

A.8 ACTIVE GARBLE DIRECTIONAL ANTENNA IMPROVEMENTS

A static simulation was developed to investigate the active garble improvement by employing a directional active antenna system. The simulation included antenna directional wedge angles of 15°, 22.5°, and 30°, which were rotated 360° about the BCAS aircraft test position. The BCAS positions were chosen to simulate areas where target #399 would be in synchronous passive garble and active interrogations would be

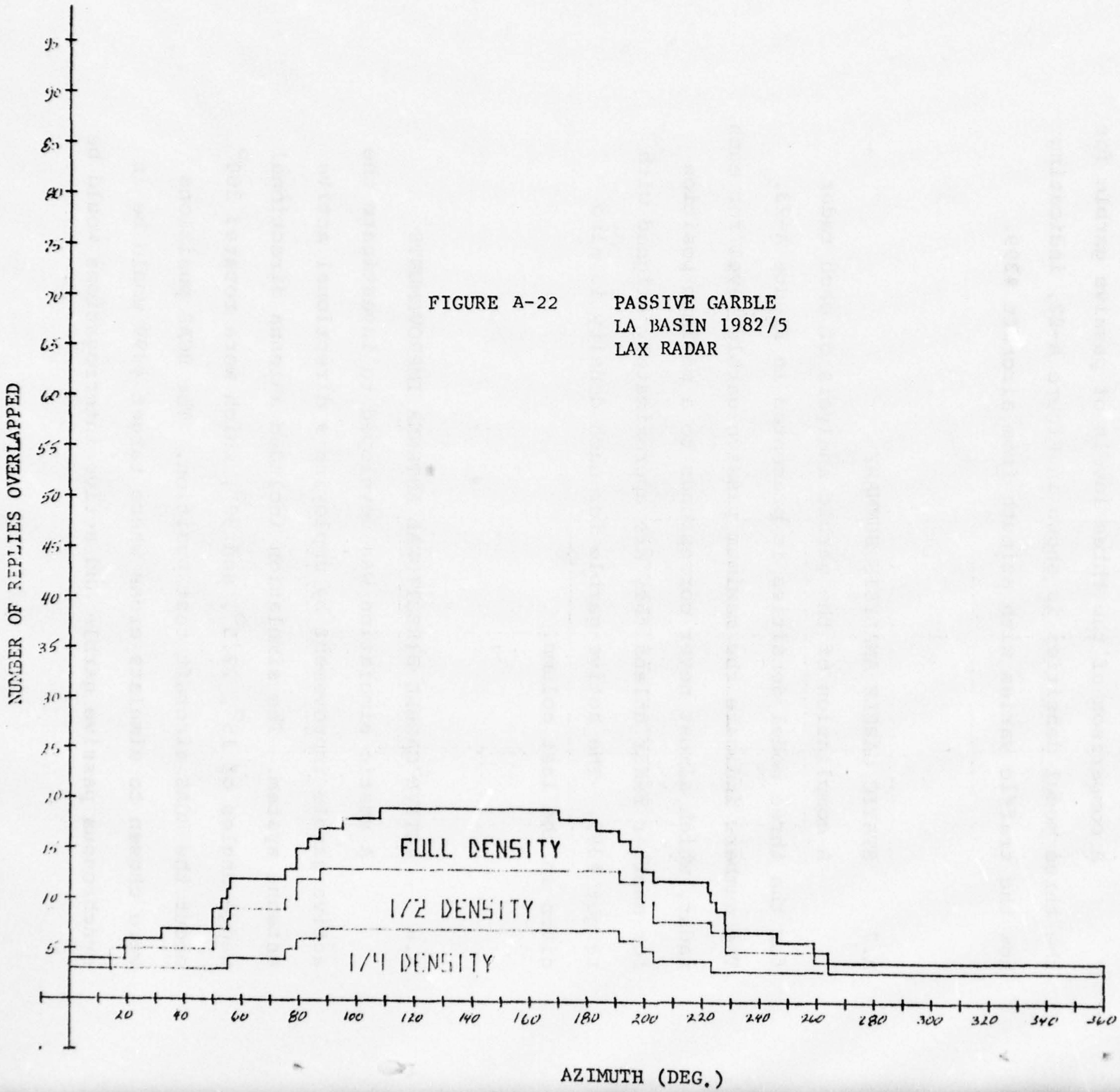


FIGURE A-22 PASSIVE GARBLE
LA BASIN 1982/5
LAX RADAR

	LAX	MAR	BUR	LGB	ONT	ELT	NOR	SP	SA	GARBLES PASSIVE*	GARBLES ACT
FULL	20	34	36	6	22	21	45	13	13	22	83
HALF	13	17	20	3	11	8	27	8	8	13	46
QUARTER	7	6	11	1	5	5	11	5	4	6	17

*allows use of six radars

FIGURE A-23 GARBLE ANALYSIS SUMMARY

necessary to augment tracking data. This meant placing the BCAS on the opposite side of target #399 from the selected radars. Figure A-24 summarizes the statistics of the directional improvement over the omni antenna for the three model densities. Figure A-25 shows the specific wedges of the directional scan and BCAS position which includes both target #399 and the radar in a passive garble geometry.

A.9 DYNAMIC, THREE-DIMENSIONAL SIMULATION

In order to verify the validity of some of the assumptions made in the formulation of the static, two-dimensional simulations, and to allow detailed investigation of some of the more complex garble phenomena, a dynamic, three-dimensional simulation was developed in Fortran IV for a CDC Cyber 175 Computer. The program accepts as input a complete description of the interrogator-aircraft environment that it is to reproduce. Interrogator characteristics specified for the simulation include latitude, longitude, scan (rotation) rate, interrogation repetition rate (including a provision for six-interval and eight-interval staggered interrogation rates), and interrogation beamwidth (assumed to be 4^{o} for purposes of the simulations whose description follows). Although the garble simulations concentrated on the use of a single interrogator at one time, some studies of fruit incorporated 70 ground sites simultaneously—all within 290 nm of LAX. Data

WEDGE ANGLE	1982 MODEL				½ DENSITY				¼ DENSITY			
	Max	Min	Avg	1σ	Max	Min	Avg	1σ	Max	Min	Avg	1σ
15°	13	0	3.22	2.49	9	0	1.58	1.61	3	0	.67	.77
22.5°	16	0	4.86	3.31	10	0	2.40	2.07	3	0	1.03	.95
30°	18	1	6.43	4.01	11	0	3.18	2.48	4	0	1.33	1.10
OMNI	77	-	-	-	38	-	-	-	16	-	-	-

Figure A-24 Active Directional Antenna Garble Statistics (Static Model)

1982 MODEL

WEDGE ANGLE

		15°	22.5°	30°	OMNI
R					
A	LAX	9	11	14	77
D					
A	LGB	6	10	12	77
R					

Figure A-25 Active Directional Antenna Wedge Garble Toward Radar (Static Model)

regarding interrogator characteristics were obtained from the file maintained by the Frequency Assignment Staff in FAA's Airways Facilities Service. These characteristics are shown in the program output listings included in Attachment 2.

Aircraft deployment made use of the same snapshot of the Los Angeles Basin model used for the static, two-dimensional simulations. The entire group of 743 aircraft was processed by the simulation. In addition to x- and y-coordinates of position, aircraft altitude, climb rate, and horizontal velocity were provided to and processed by the program. The "dynamic" nature of the program is due to its ability to account for aircraft motion (including that of the BCAS aircraft) as well as for rotation of the interrogators. Turn rates specified in the Los Angeles Basin model are ignored; instead, the aircraft are moved in straight lines according to the horizontal velocity components specified in the model. All aircraft are assumed to be equipped with a transponder that radiates at a particular power level (nominally 500 watts at the antenna end of the transmission line) and with a specified reply probability. To minimize the execution time of the program, a parameter is required to specify the interval at which aircraft positions are updated. BCAS aircraft position and velocity in three dimensions are specified in a similar manner.

The dynamic simulation uses a basic "frame time" of 2.5 ms within which to compute the various interrogator-aircraft interactions. The simulation begins with a random selection of interrogator azimuths and interrogation pulse start times. Thereafter, the azimuth and interrogation time are propagated according to the rate specified in the input file. Any interrogation that occurs during a current time frame may elicit a reply during either the current frame or the subsequent frame. Most of the simulation program logic is concerned with the bookkeeping tasks associated with accounting for the interrogations and replies as they occur in separate time frames.

For simulations of garble phenomena, two windows are computed. Both involve a protection distance which, although parametric within the program, has been assumed to be 20 nm in the computer runs made to date. First, an azimuth window is established to ensure proximity among BCAS, target aircraft, and the main beam of the interrogator eliciting replies from the target. The azimuth window is opened with respect to a particular interrogator when the boresight of the main beam is separated from the line of sight to the BCAS aircraft by no more than the angle θ, where

$$\theta = \tan^{-1}\left(\frac{d_p}{\rho_{IB}}\right) + \frac{\gamma}{2}$$

In this equation,

d_p = the protection distance (20 nm)

ρ_{IB} = the projection of the vector from the interrogator of interest to the BCAS aircraft in the horizontal plane

γ = interrogator beam width

Having established an azimuth window, the program computes a time window within which replies from a target aircraft must fall if the aircraft is within the protection distance. The time window begins three microseconds (to account for transponder delay) after the interrogation from the ground site of interest arrives at the BCAS aircraft, and ends approximately 250 microseconds later, when the interrogation would have had time to travel past BCAS out to the extreme of the protection range and back again to BCAS—a distance of some 40 nm. An aircraft located at this extreme would have taken the longest time to be detected by BCAS, yet still be within the protected range.

Once the two windows are established, the program begins an iterative process of reply generation for all aircraft/interrogator interactions during the frame. If no interrogation occurs during the current frame, then no further action is required with regard to that particular interrogator during the frame. Otherwise, the interrogation

time and interrogator azimuth are computed. Next, a test is made to see if each aircraft is located within the main beam of the interrogator of interest. If it is not, processing continues with the next aircraft; if the aircraft is within the main beam, another test is performed to ensure that the aircraft is visible above the radar horizon. Although the aircraft movement geometry is executed for a flat earth, the equivalent radar horizon calculation is made assuming a spherical earth with four-thirds its actual radius. Finally, a random number generator is employed in conjunction with the reply probability parameter supplied as input to the program in order to determine if a reply will be generated. Once the reply probability test is passed, a reply is generated, and its arrival time and power at BCAS stored in an array for subsequent processing.

This iterative process continues until all replies have been generated (in no particular time order) and stored in a reply array. At the end of the frame, the reply array is ordered chronologically and made available for printing or subsequent processing. The incorporation of reply pulse arrival time and power, as well as the inclusion of aircraft and interrogator numbers associated with each reply, makes further detailed analysis of garble and reply processing a straightforward task. Aircraft identification, for example, will allow altitude information pulses to be generated when

specific degarblers and reply processors are ready to be evaluated. Even the effects of pulse stretching and phase cancellation can be analyzed in detail with such a model. These phenomena are the subjects of continuing investigations.

A.10 RESULTS OF THE DYNAMIC SIMULATION

The dynamic simulation has been used to validate some of the data obtained in the two-dimensional static simulations. By placing the BCAS aircraft at a location 10 nm south of aircraft #399, for example, the peak number of garbled replies was found to correlate with the static model to within 13%. Within the windows for the Norton AFB radar, 39 garbled replies were found in the three-dimensional simulation versus 45 in the two-dimensional model. One reason for the smaller number in the three-dimensional simulation is the fact that several aircraft were too low to be interrogated by the Norton radar, although they were within the protected range of the BCAS. The two models can thus be reconciled despite only minor differences.

Fruit counts obtained for the entire environment of 70 interrogators and 743 aircraft also correlate well with both measurements and predictions of interrogations and replies reported previously. Fruit averaged 62,500 replies per second and peaked at 84,000 per second over the period

measured. The lowest rate detected during the period was 44,000 replies per second.

Perhaps the most important results obtained to date with the three-dimensional simulation will allow important decisions to be made regarding radar selection and mode selection logic. These results indicate the average and maximum number of garbled replies detected on a complete scan of the nine radars of primary interest within the basin. The BCAS aircraft was placed at 10-nm intervals along radials extending north, east, south, and west from LAX. At each position of the BCAS aircraft, the number of garbled replies was determined for each sweep of the radar (each time window) within its azimuth window. The extreme values and the average over all sweeps were recorded. One garble is caused by two overlapping replies; two garbles by three overlapping replies; and so on. A single reply, of course, is ungarbled. No reply during a sweep was not included in the average. The minimum number of garbles in every case except one was zero; that is, in nearly every geometry, including the very worst, there was at least one sweep in which some reply arrived in the clear. The lone exception had a single garble as its minimum. The complete results are presented in Figures A-26 through A-29.

Similar runs were made for the operational 068° approach to LAX and for the southern departure at 120°. These results are presented in Figures A-30 and A-31.

DISTANCE (NM) FROM LAX ALONG NORTH RADIAL

RADAR	10	20	30	40	50	60
LAX	.8/9	1.7/11	2.7/11	3.7/12	4.9/14	6.1/19
Burbank	.8/5	.2/2	.3/3	.7/4	1.0/6	1.5/8
El Toro	9.2/24	9.8/25	10.7/24	10.6/26	11.6/27	11.8/25
Long Beach	2.3/9	3.1/15	4.5/17	4.9/17	6.5/18	7.6/18
March	11.9/55	9.7/54	6.6/43	4.2/13	4.0/11	3.9/11
Norton	7.9/41	5.6/30	2.7/17	2.5/10	3.0/10	2.9/10
Ontario	5.6/25	4.1/20	2.3/15	1.8/9	2.3/9	2.4/9
San Pedro	2.6/13	5.2/19	7.1/20	9.0/21	10.9/22	12.7/23
Santa Ana	6.3/21	7.2/24	8.4/23	8.8/23	10.1/23	10.8/21

Figure A-26 Average/Peak Garble for North Radial from LAX

RADAR	DISTANCE (NM) FROM LAX ALONG EAST RADIAL					
	10	20	30	40	50	60
LAX	1.3/7	2.1/9	4.2/18	7.9/23	12.6/28	15.8/32
Burbank	2.3/9	2.6/13	3.4/15	6.0/26	9.1/30	10.6/33
El Toro	4.6/14	2.6/10	1.6/8	1.5/9	1.6/11	2.0/14
Long Beach	1.2/11	1.2/10	2.0/11	3.9/16	7.0/25	9.1/25
March	9.0/34	5.6/22	2.9/14	1.5/11	.6/6	.0/0
Norton	7.8/34	5.2/28	2.7/15	1.8/12	.9/9	.6/9
Ontario	4.0/17	2.6/14	1.2/8	.8/7	.7/3	1.1/3
San Pedro	1.7/10	2.3/11	4.1/14	7.6/26	12.7/39	15.9/39
Santa Ana	3.2/10	2.0/8	1.8/9	1.7/12	2.4/17	3.2/18

Figure A-27 Average/Peak Garble for East Radial from LAX

RADAR	10	20	30	40	50	60
	DISTANCE (NM) FROM LAX ALONG SOUTH RADIAL					
LAX	1.0/9	1.8/11	2.3/12	3.1/12	3.2/12	3.5/12
Burbank	3.2/15	6.1/22	8.8/22	11.5/27	11.5/23	11.7/23
El Toro	8.0/25	6.4/25	4.4/18	2.5/10	1.1/7	.6/2
Long Beach	1.5/8	2.1/8	2.8/7	3.3/9	3.7/9	3.9/9
March	15.6/33	16.1/33	14.1/32	10.4/30	6.1/25	3.2/9
Norton	16.1/39	19.3/37	19.7/38	19.2/37	16.3/37	12.3/33
Ontario	10.5/24	13.4/27	16.6/27	16.4/29	15.1/29	13.7/28
San Pedro	.5/6	.3/2	.3/2	.7/3	.8/3	.7/3
Santa Ana	5.2/15	4.3/16	3.5/13	2.8/13	2.0/13	1.4/7

Figure A-28 Average/Peak Garble for South Radial from LAX

RADAR	DISTANCE (NM) FROM LAX ALONG WEST RADIAL 10	20	30	40	50	60
LAX	3.0/7	2.6/7	1.7/7	1.1/5	.6/4	.4/3
Burbank	4.3/11	3.8/11	2.9/10	2.0/7	1.5/8	1.6/9
El Toro	19.7/35	18.7/35	18.0/32	16.7/28	14.5/26	12.3/25
Long Beach	6.0/17	5.4/17	4.5/15	3.9/11	3.2/10	2.9/11
March	34.0/56	34.0/62	33.6/69	31.4/67	26.7/63	21.5/53
Norton	32.0/57	30.4/56	28.3/56	25.1/56	21.3/55	17.0/52
Ontario	26.4/38	24.9/38	22.4/36	19.6/36	16.3/36	12.8/34
San Pedro	1.5/8	1.5/7	1.1/7	.7/5	1.0/12	1.4/12
Santa Ana	14.3/29	13.5/29	12.4/26	11.6/22	9.7/21	8.2/18

Figure A-29 Average/Peak Garble for West Radial from LAX

RADAR	DISTANCE (NM) FROM LAX ALONG 068° RADIAL 10	20	30	40	50	60
LAX	1.2/7	2.0/10	3.8/19	5.3/23	6.9/25	8.6/27
Burbank	1.8/8	1.8/12	1.9/13	2.5/14	1.9/13	1.3/6
El Toro	5.0/17	4.3/16	3.8/11	3.6/11	4.1/14	4.3/15
Long Beach	1.4/11	1.6/11	2.9/13	4.3/14	5.2/15	6.7/18
March	8.8/38	5.4/29	2.8/17	1.6/9	0.6/5	0.1/1
Norton	6.9/34	4.1/30	2.0/15	1.3/8	0.7/8	0.3/1
Ontario	3.7/18	2.3/14	0.9/7	0.3/6	0.0/1	0.1/1
San Pedro	1.9/11	2.9/15	5.2/20	7.7/22	10.4/25	12.9/35
Santa Ana	3.5/12	3.3/10	3.5/11	3.7/13	4.9/17	5.8/18

Figure A-30 Average/Peak Garble for 068° Radial from LAX

DISTANCE (NM) FROM LAX ALONG 120° RADIAL

RADAR	10	20	30	40	50	60
LAX	1.5/9	2.8/11	5.4/20	9.9/21	13.2/26	15.1/29
Burbank	2.8/9	4.3/16	8.0/23	12.2/26	15.0/28	18.3/29
El Toro	4.7/16	2.2/9	1.1/7	0.2/3	0.2/2	0.2/1
Long Beach	1.0/7	0.8/9	1.5/8	2.7/9	4.0/14	4.8/16
March	10.4/28	6.3/22	3.4/15	1.5/9	0.9/8	0.4/2
Norton	10.2/34	8.3/28	5.5/22	3.2/17	1.8/13	0.5/3
Ontario	5.7/17	4.0/14	3.1/19	2.7/16	1.9/13	2.0/9
San Pedro	1.4/10	1.8/11	3.2/13	6.0/16	8.1/17	9.6/17
Santa Ana	3.2/13	1.5/8	0.7/6	0.2/2	0.4/4	0.7/4

Figure A-31 Average/Peak Garble for 120° Radial from LAX

FOR

FIGURE A-32

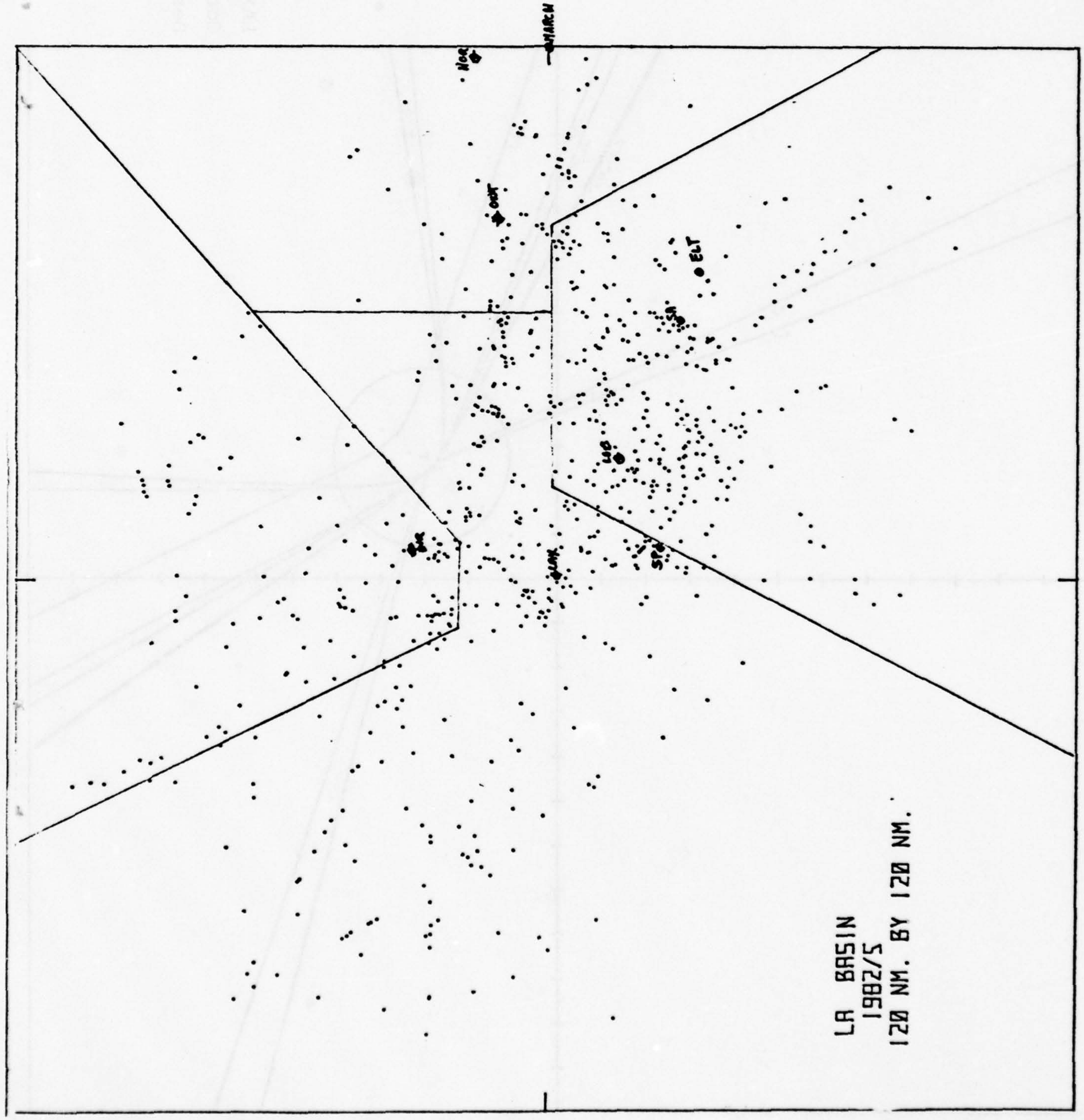
LA BASIN GARBLE DATA PLOT

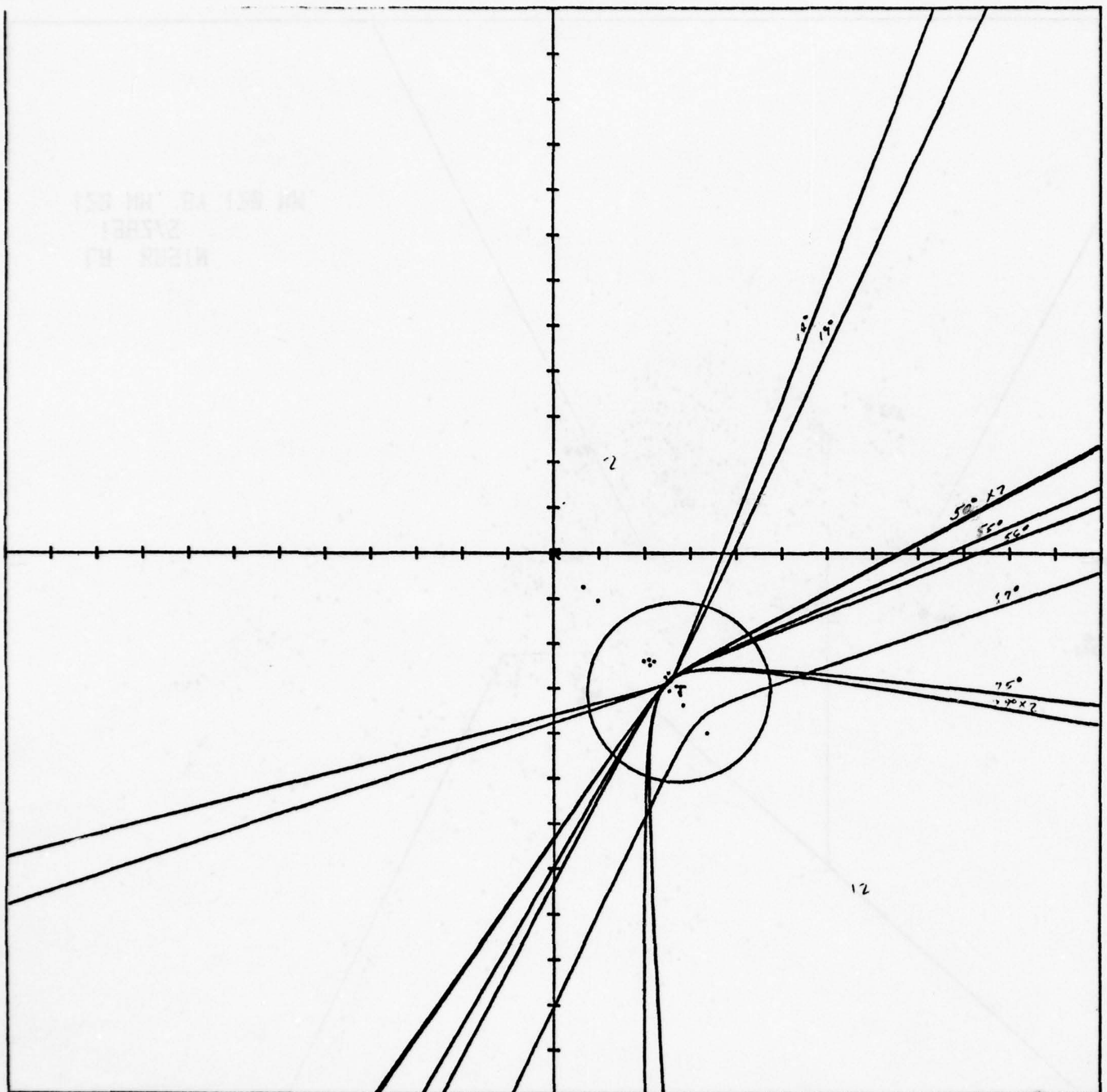
(SEE DRAWINGS PACKET)

APPENDIX A

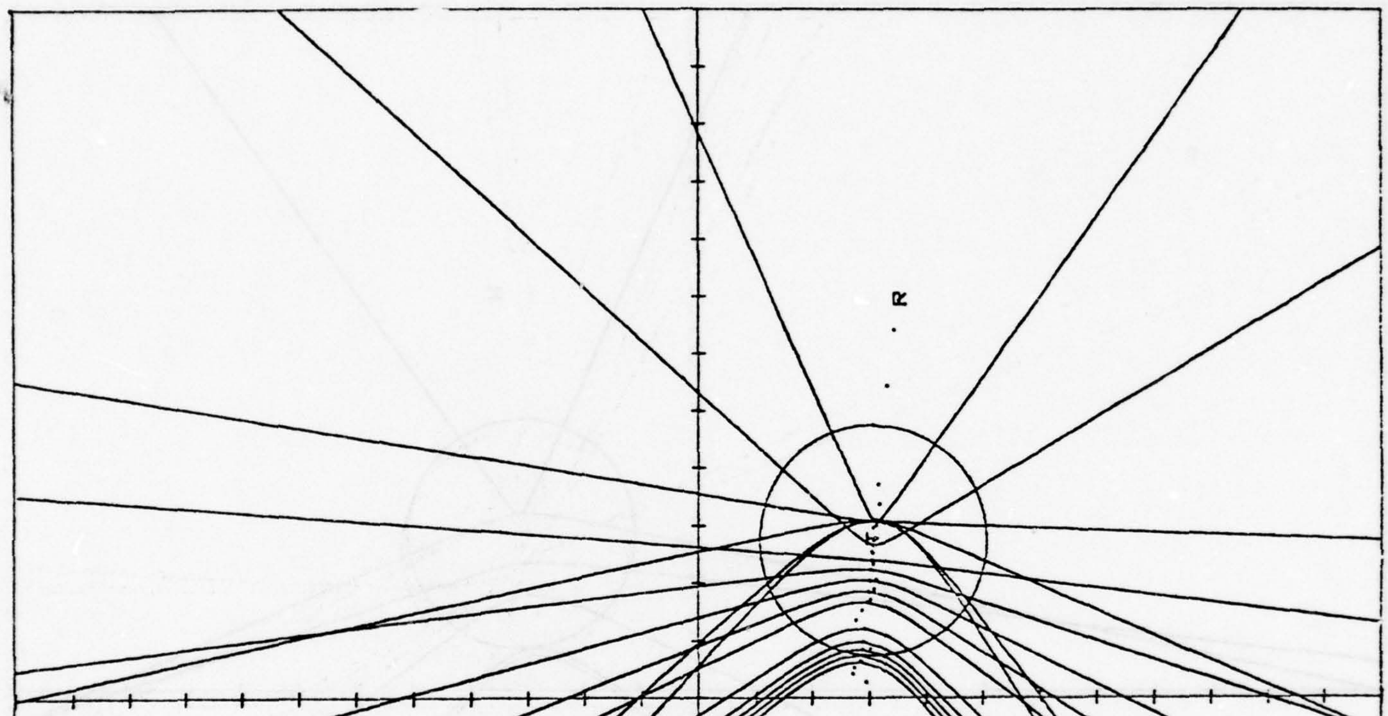
ATTACHMENT 1

The following are passive garble contours for target #399 in the LA Basin plotted with respect to each of 9 radars for three Basin traffic densities.

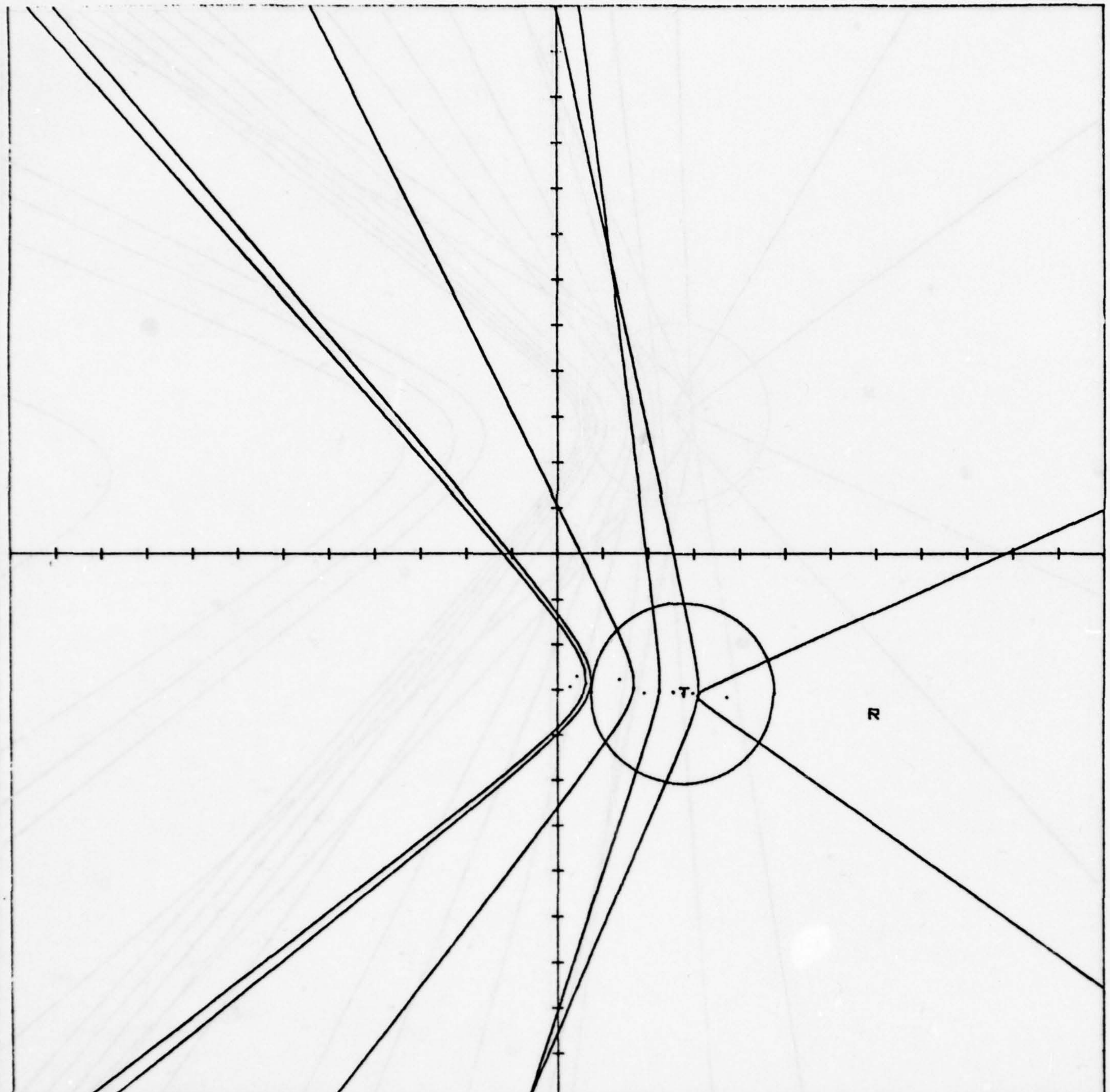

LA BASIN
1982/5
120 NM. BY 120 NM.



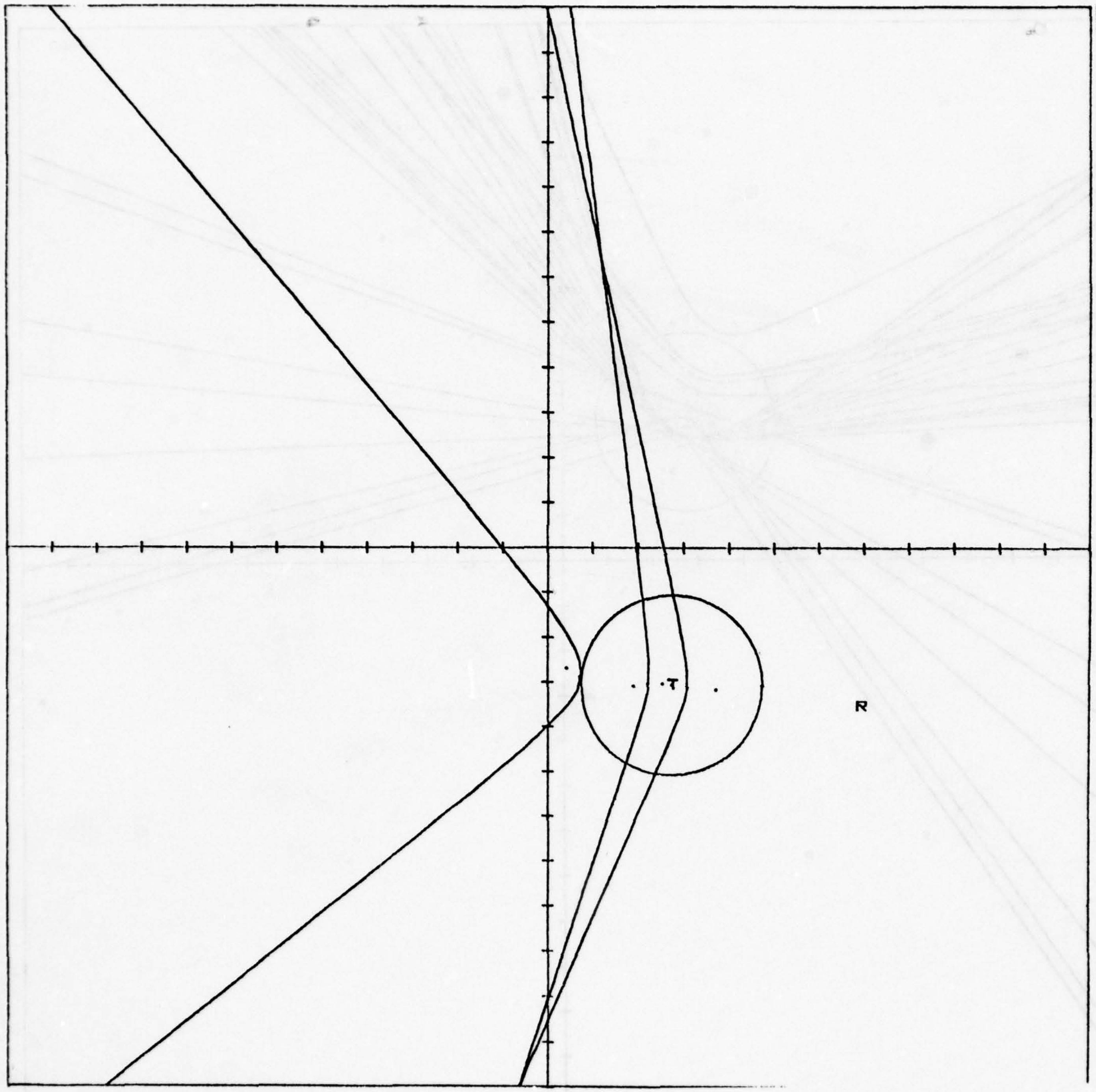
LAX Radar Garble
Contours for Half
Density



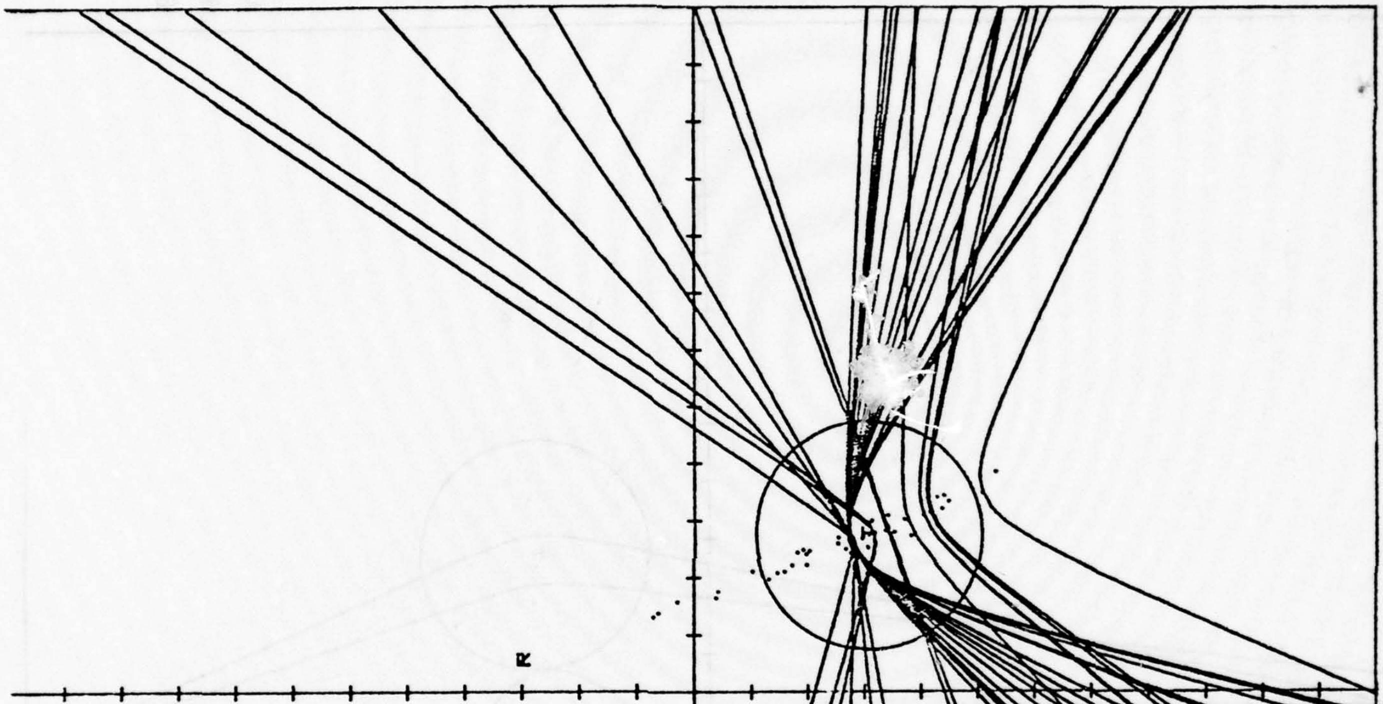
El Toro Radar
Garble Contours
for Full Density



El Toro Radar
Garble Contours
for Half Density

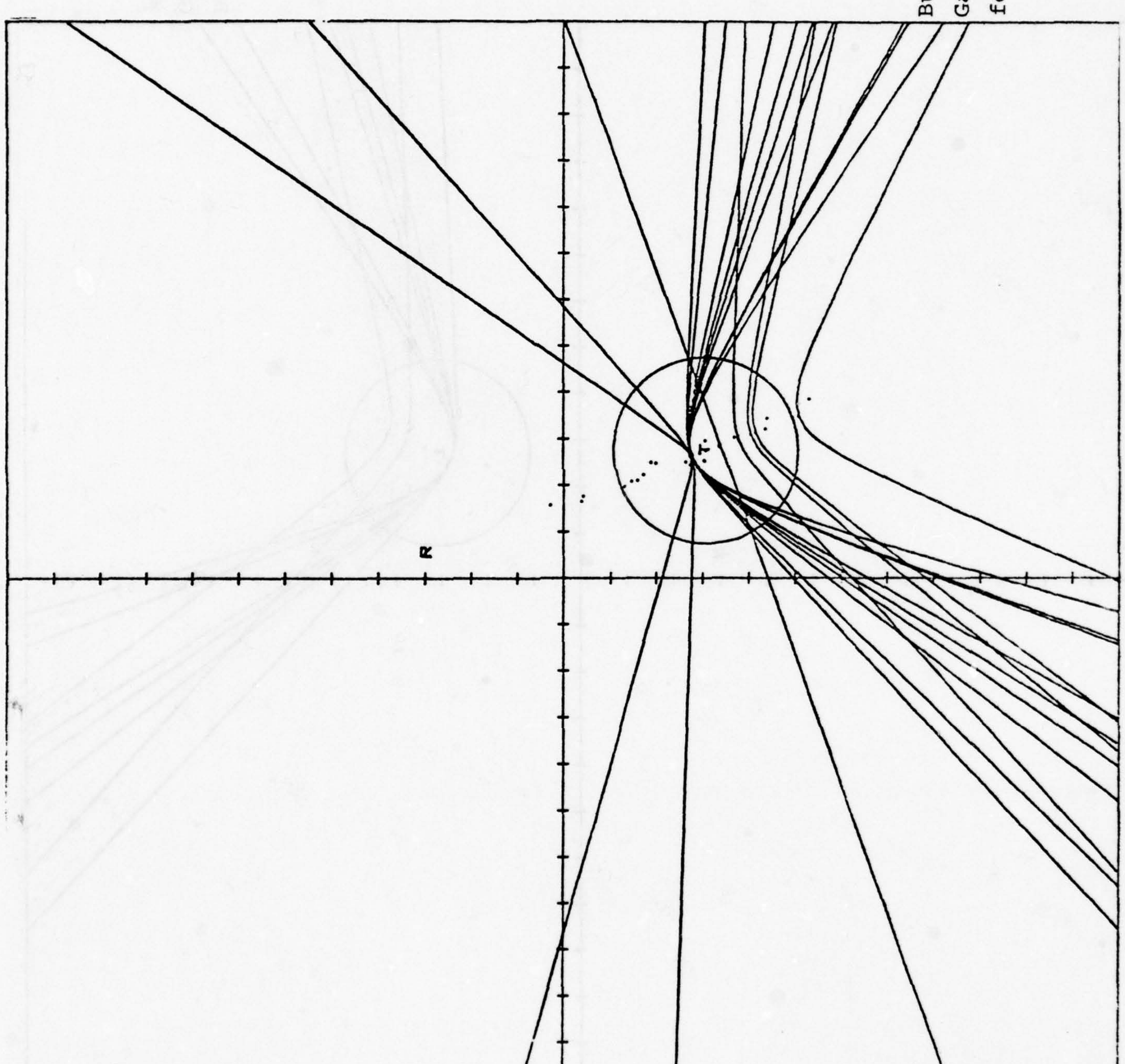


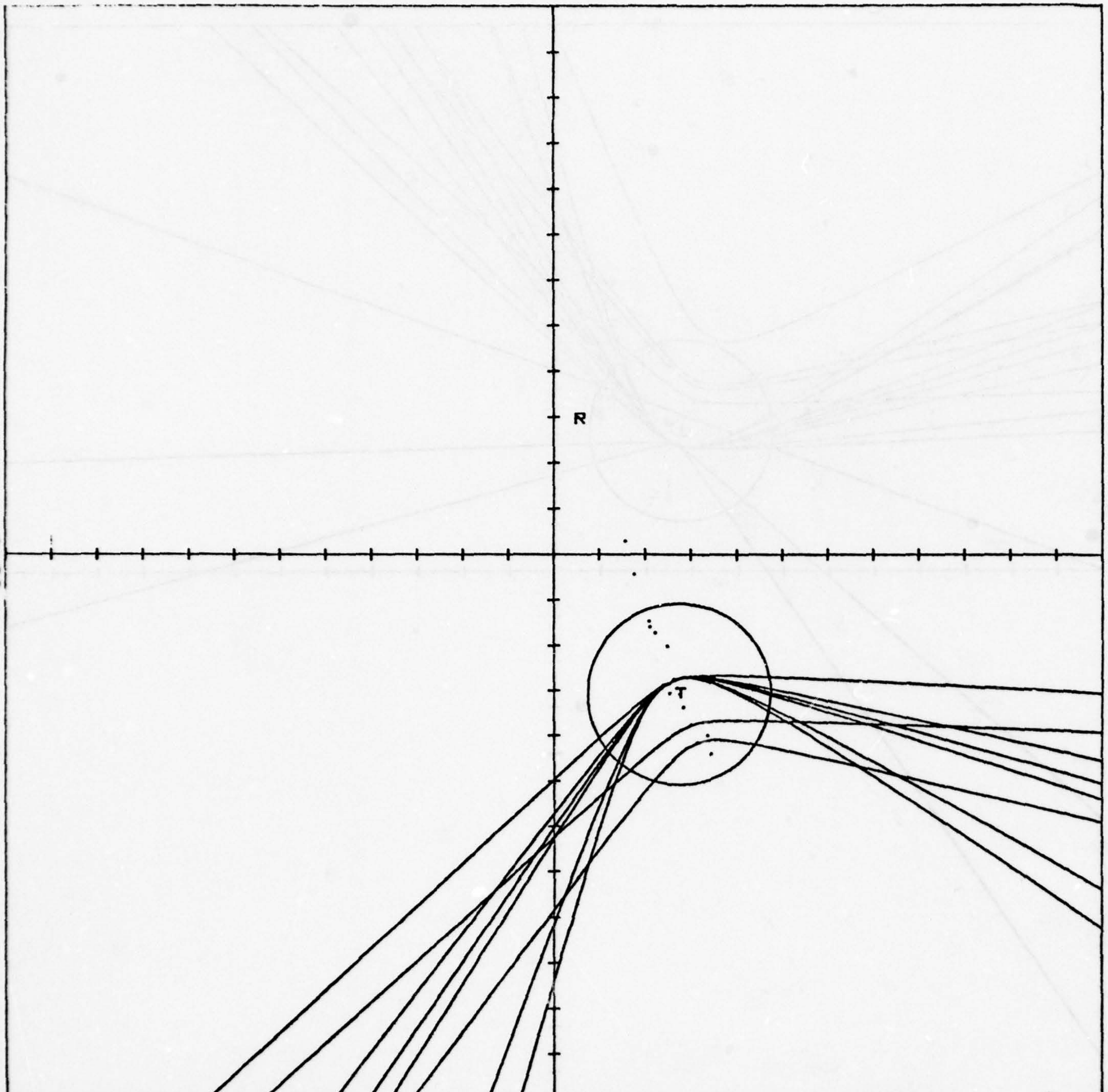
El Toro Radar
Garble Contours
for Quarter Density



Burbank Radar
Garble Contours
for Full Density

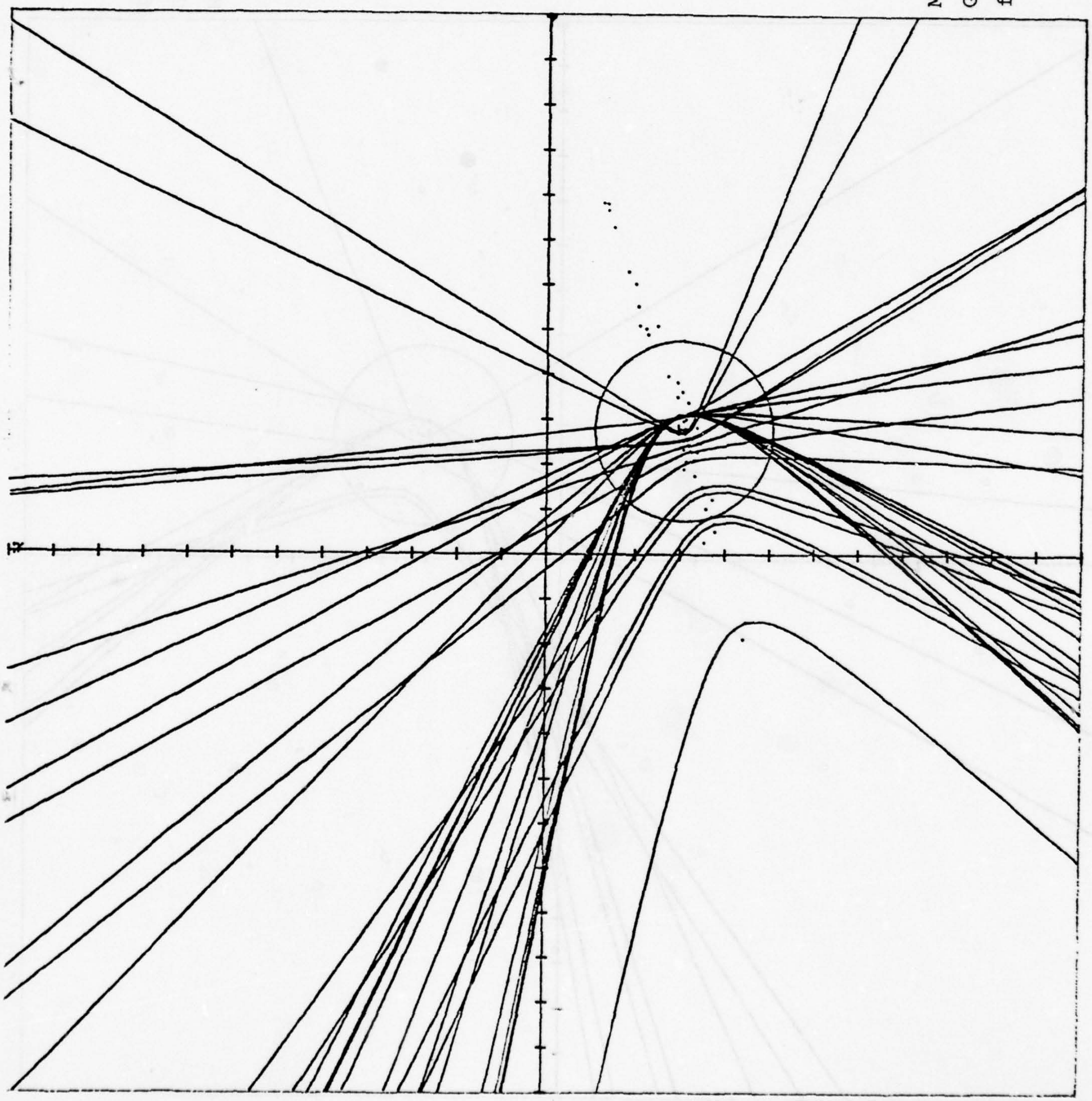
Burbank Radar
Garble Contours
for Half Density



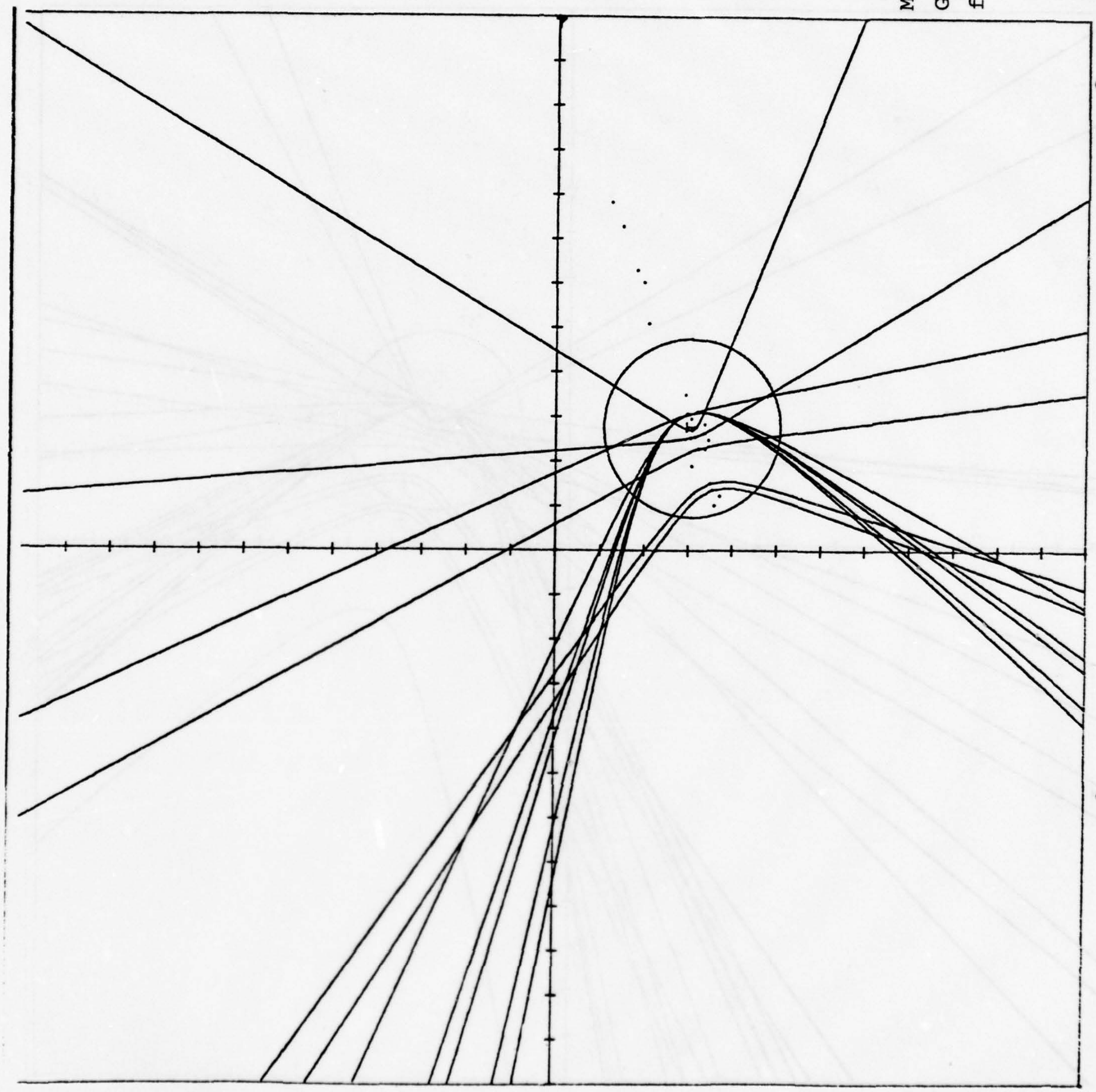


Burbank Radar
Garble Contours
for Quarter Density

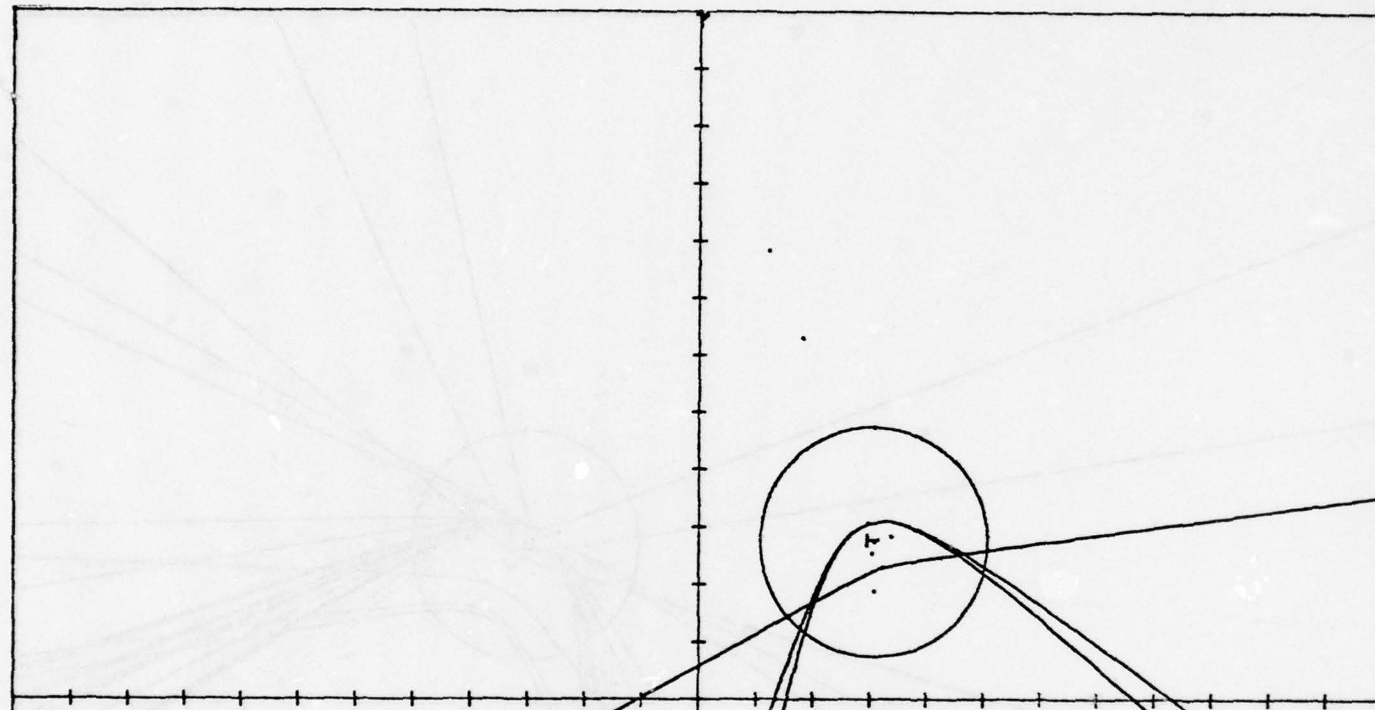
March Radar
Garble Contours
for Full Density

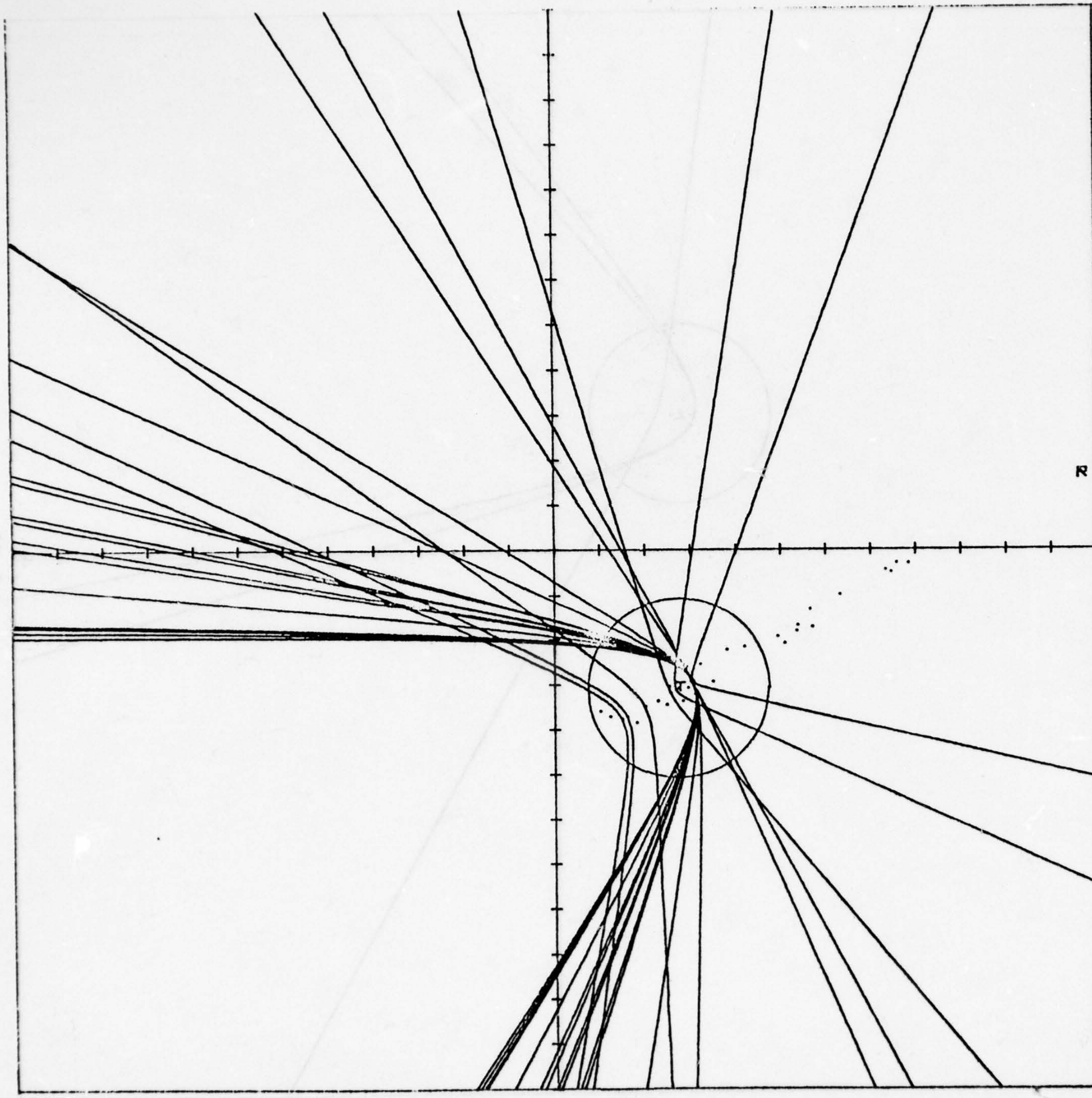


March Radar
Garble Contours
for Half Density

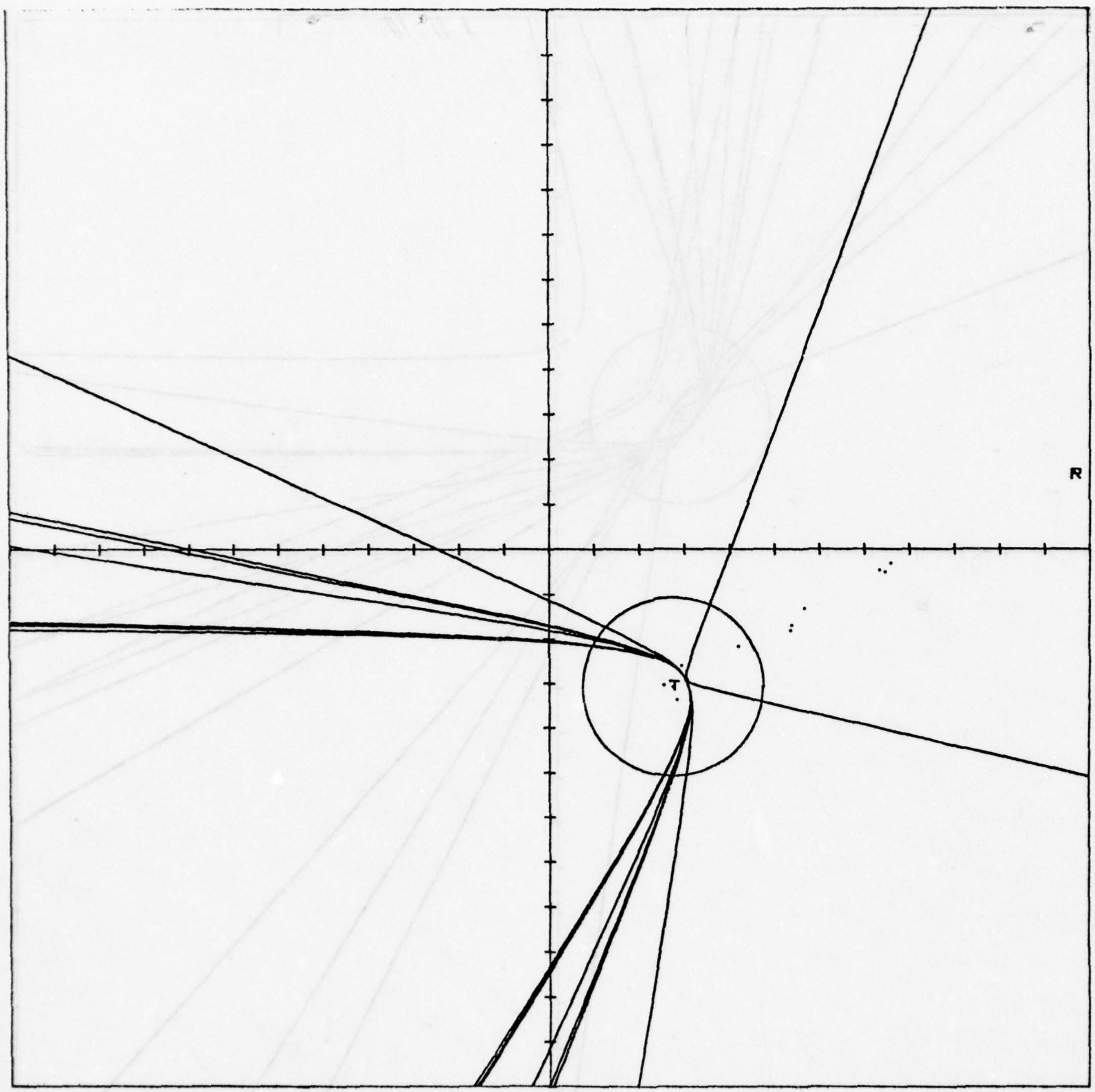


March Radar
Garble Contours
for Quarter Density

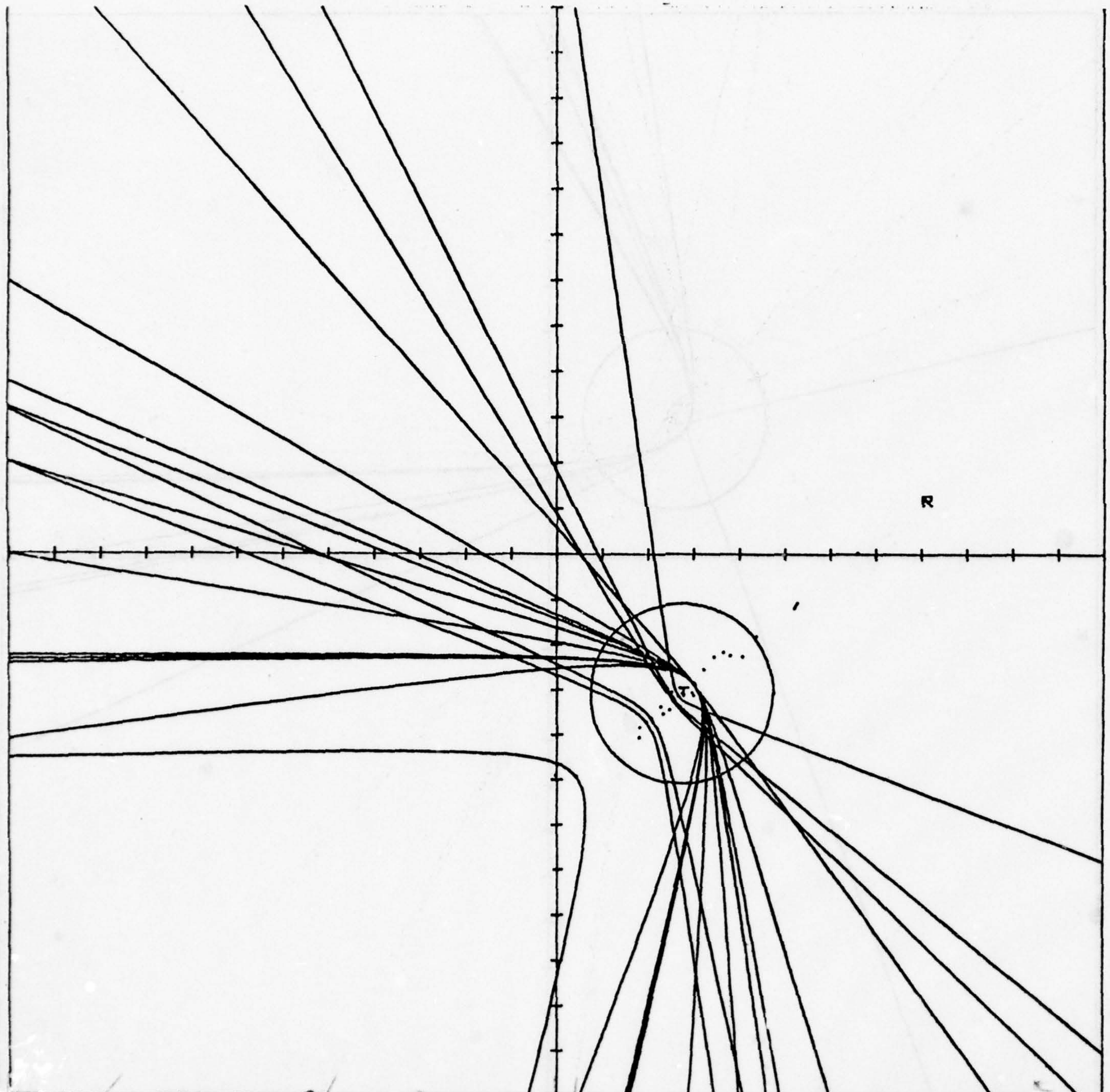




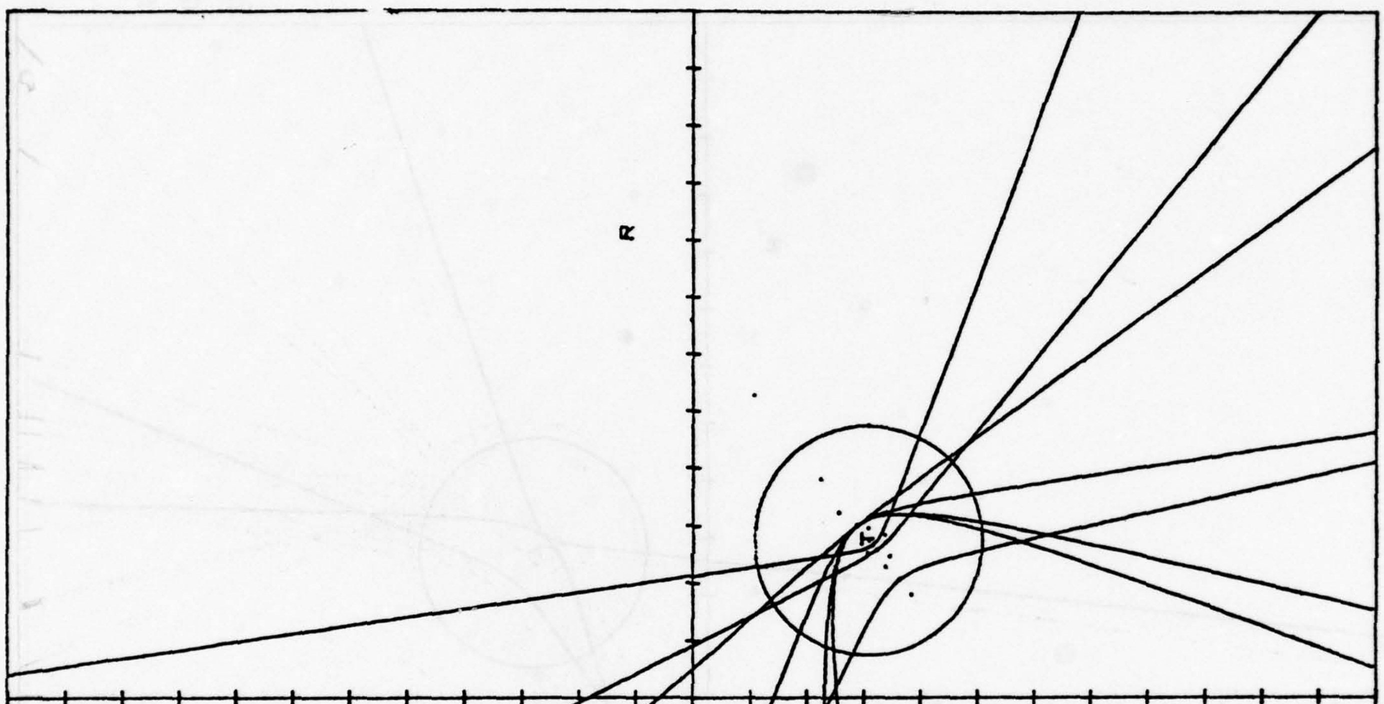
Norton Radar
Garble Contours
for Full Density



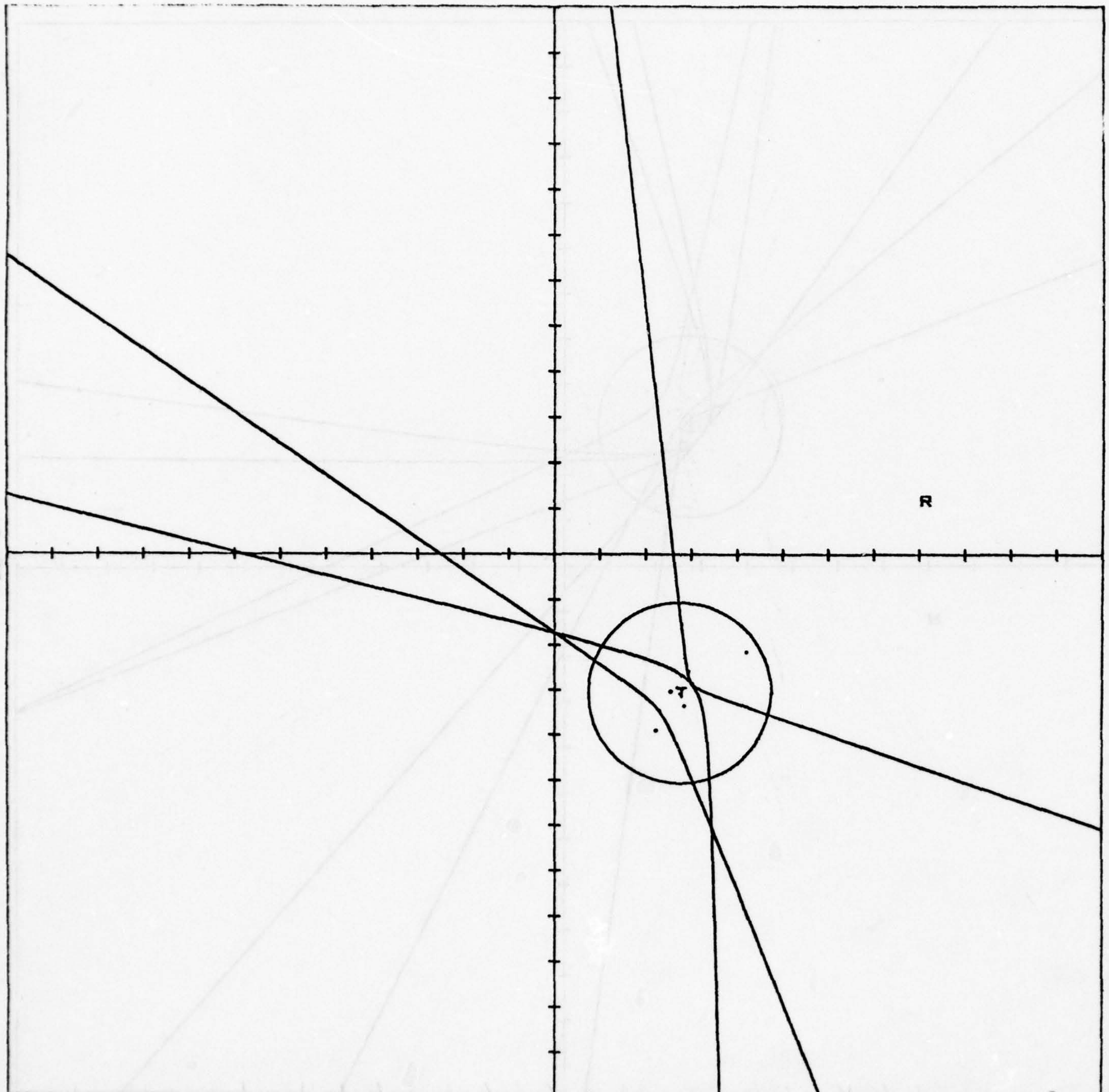
Norton Radar
Garble Contours
for Quarter
Density



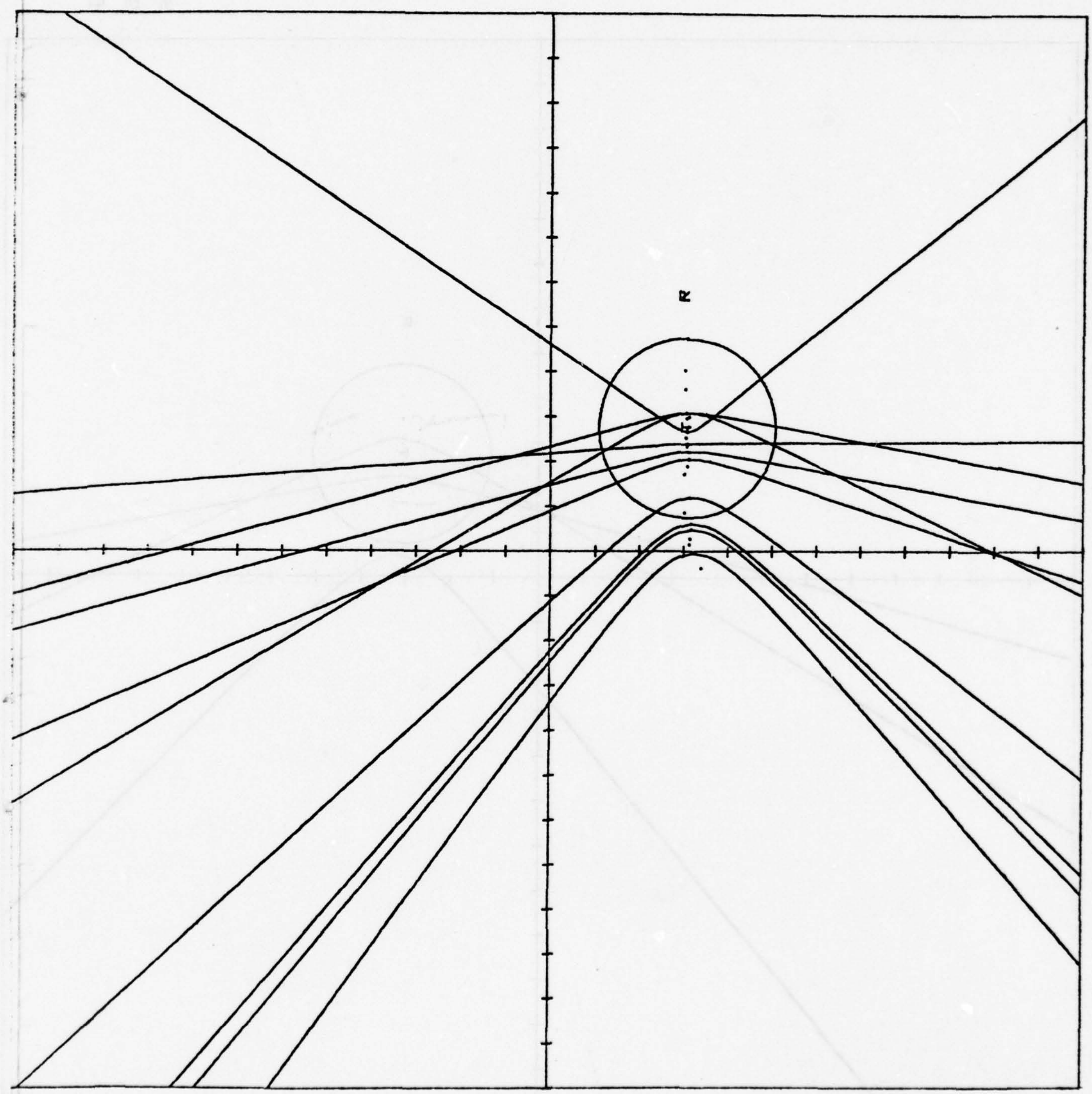
Ontario Radar
Garble Contours
for Full Density



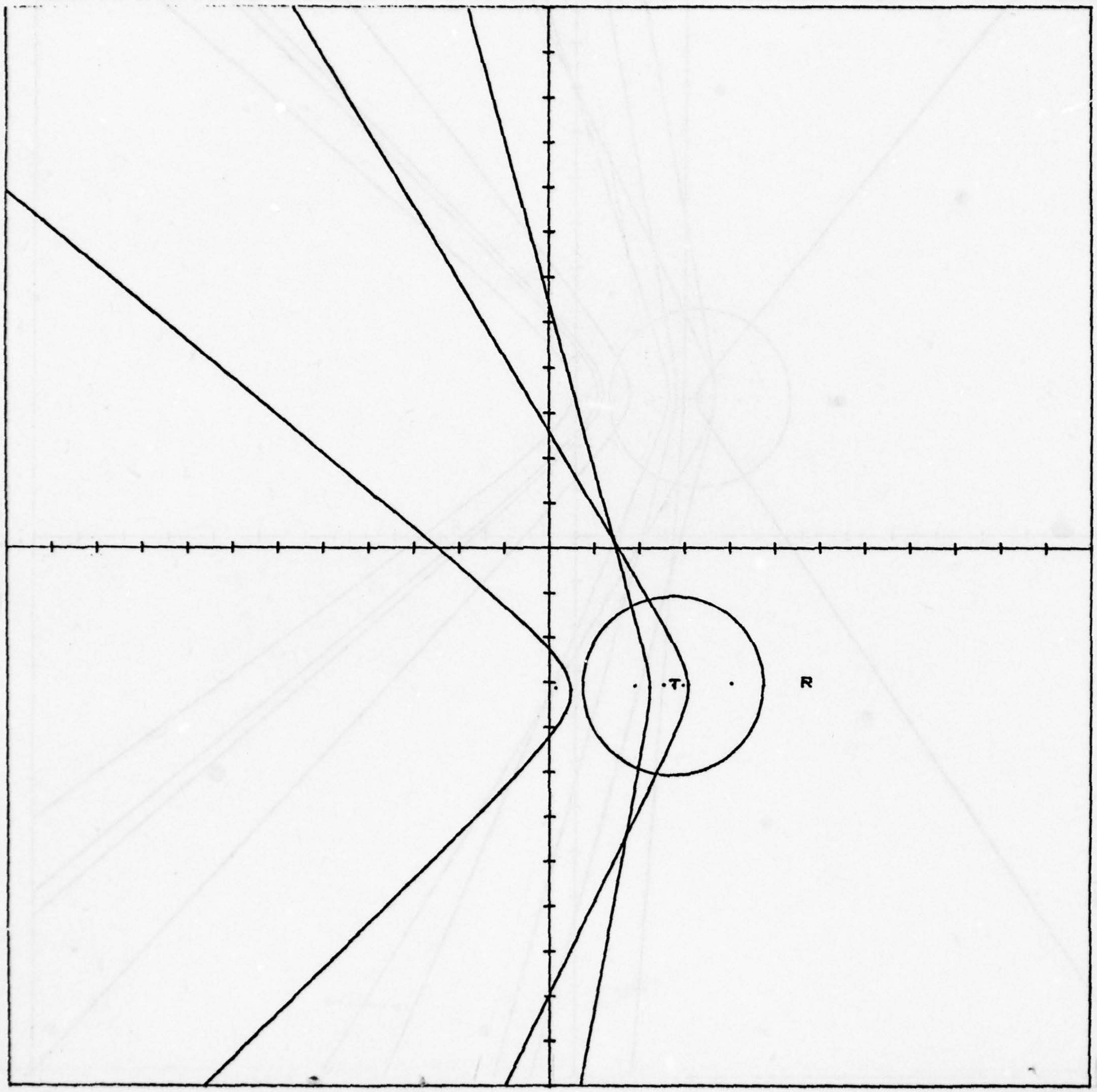
Ontario Radar
Garble Contours
for Half Density



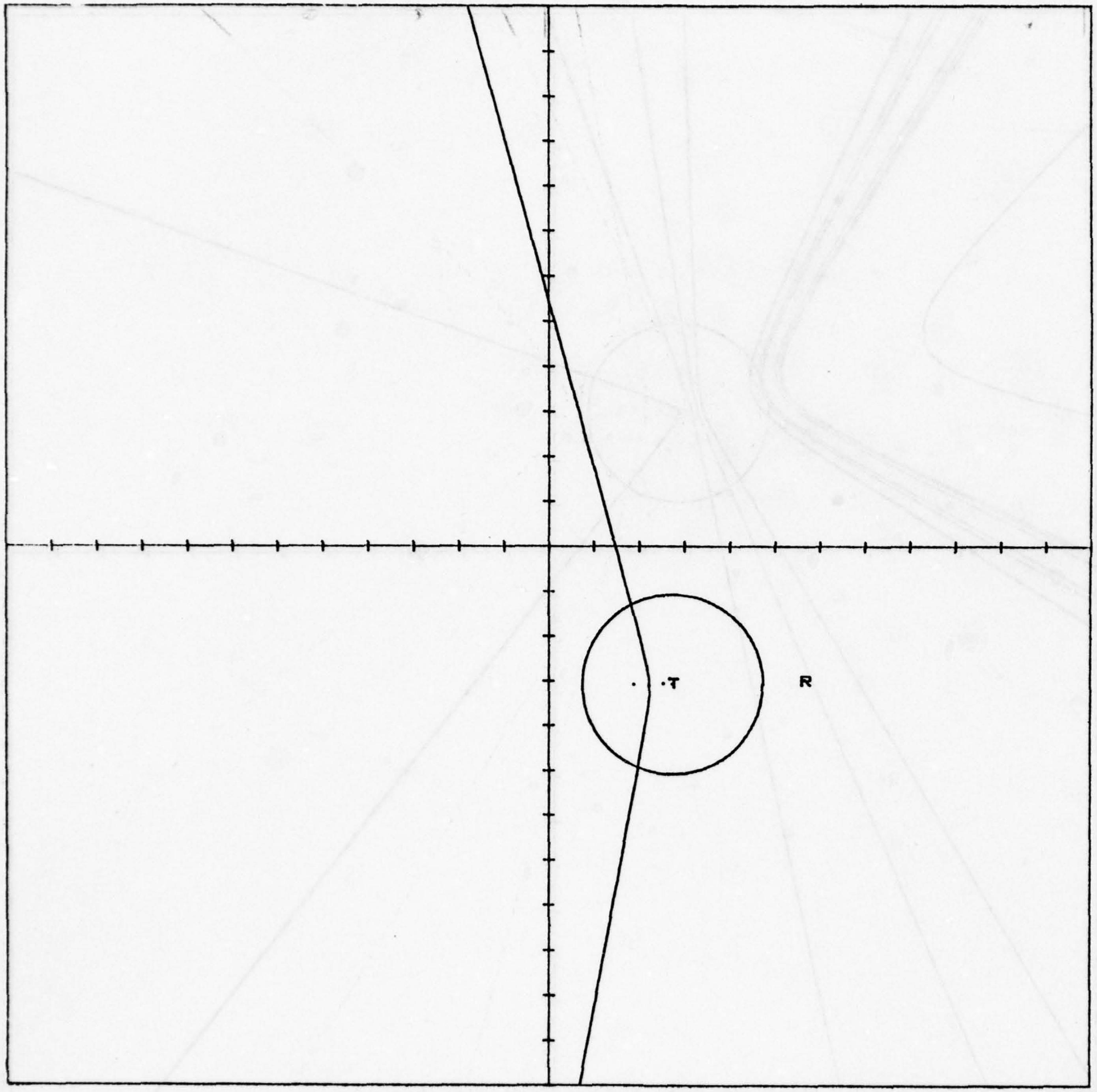
Ontario Radar
Garble Contours
for Quarter Density



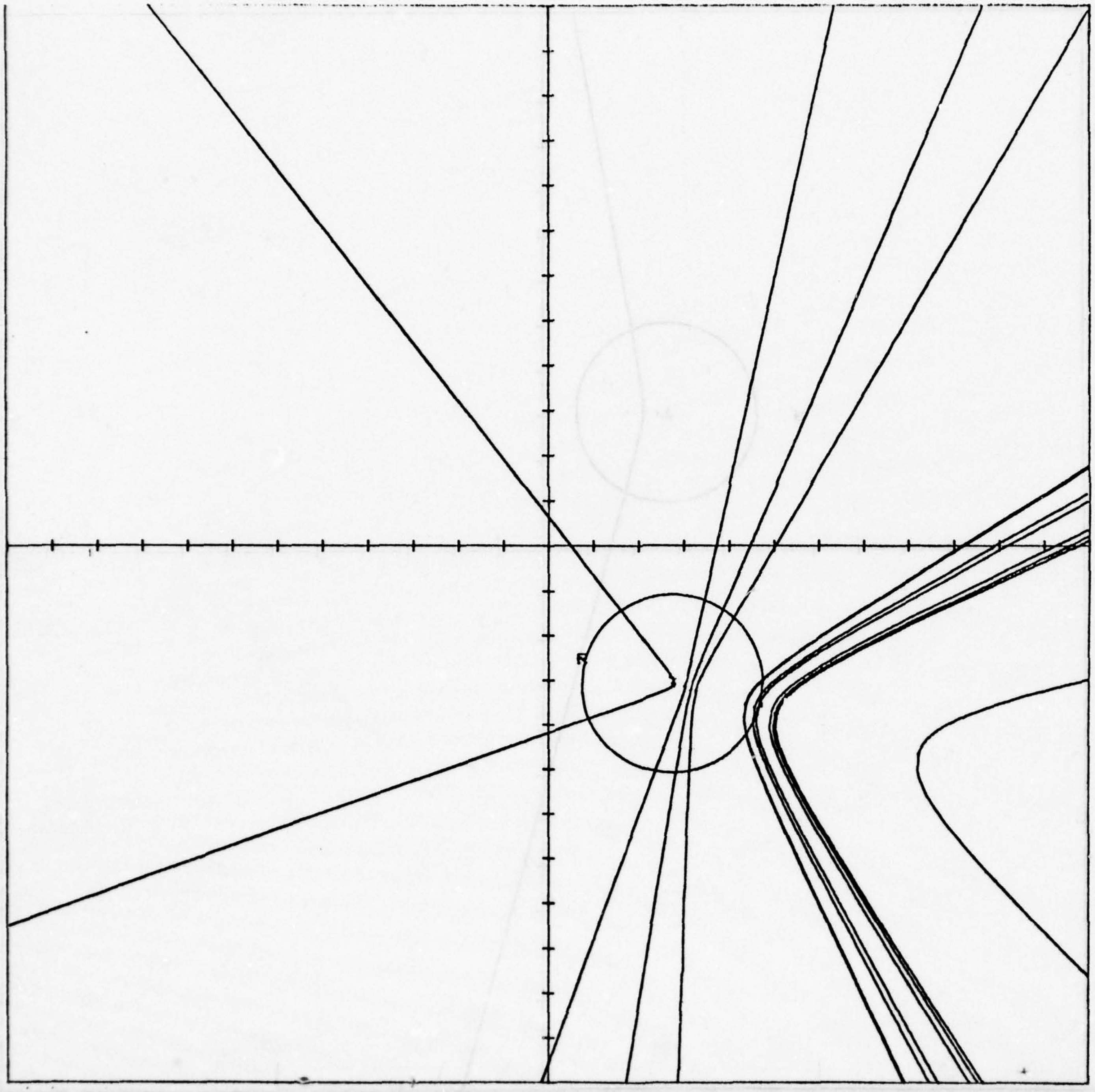
Santa Ana Radar
Garble Contours
for Full Density



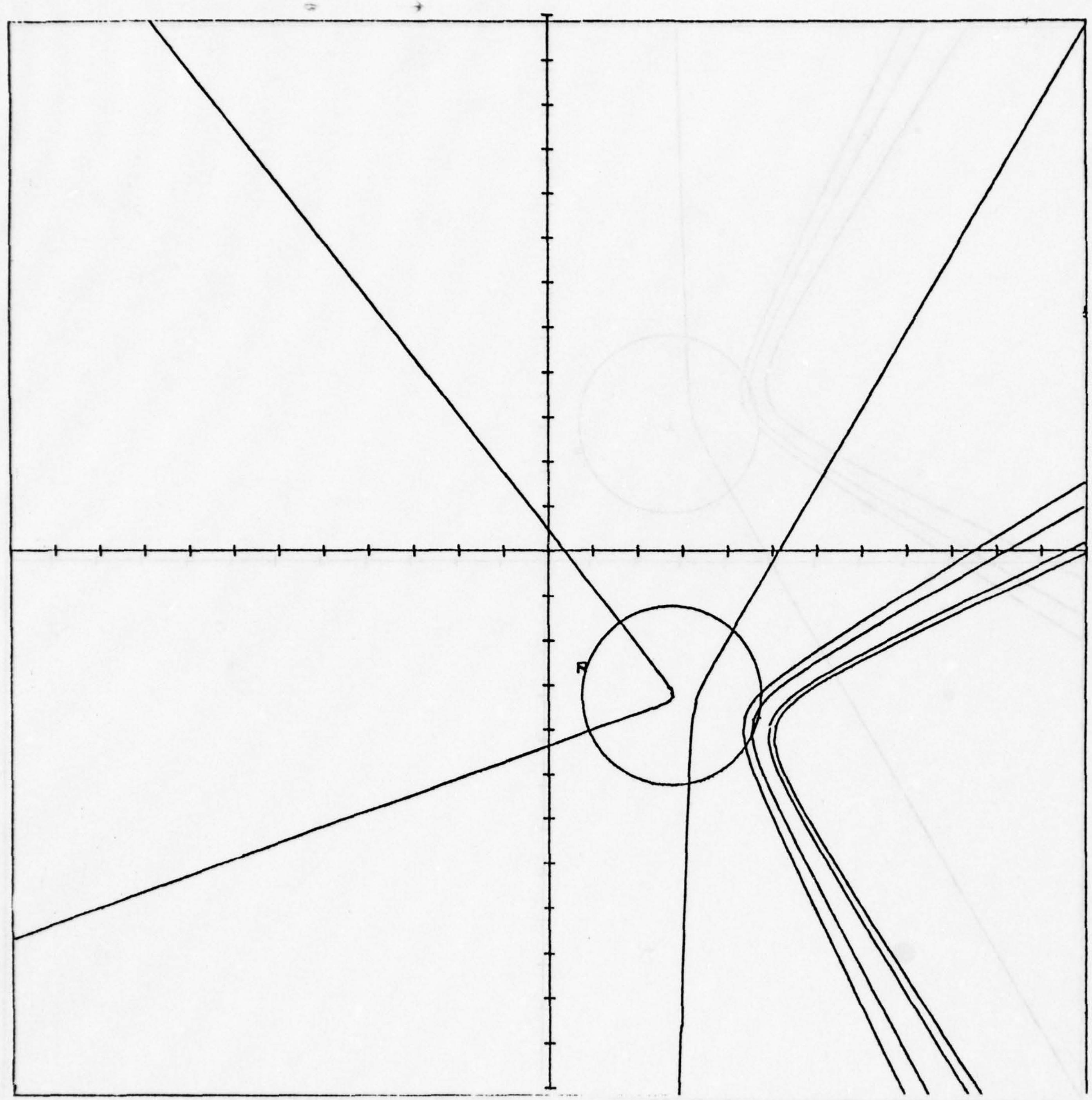
Santa Ana Radar
Garble Contours
for Half Density



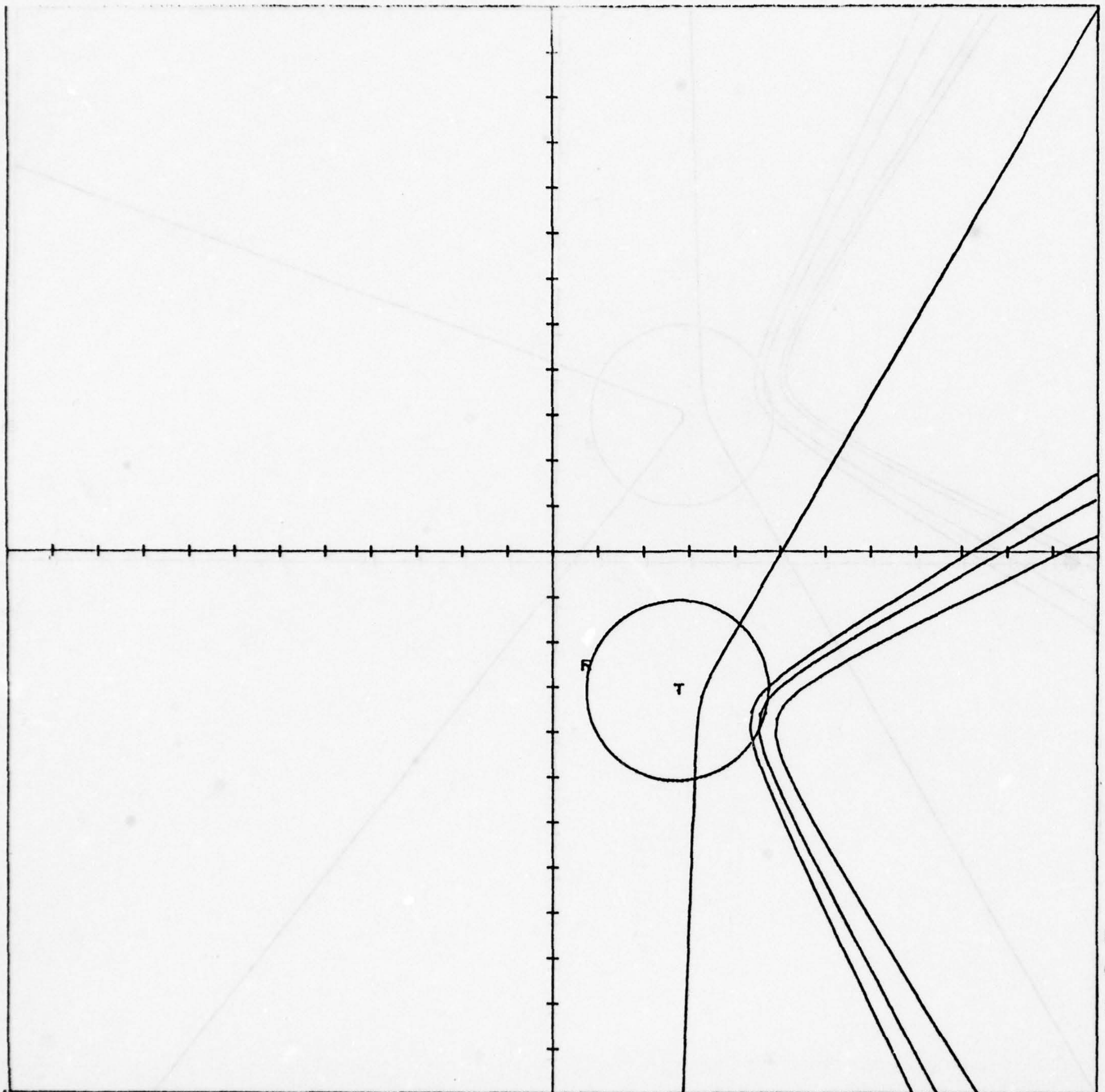
Santa Ana Radar
Garble Contours
for Quarter Density



San Pedro Radar
Garble Contours
for Full Density



San Pedro Radar
Garble Contours
for Half Density



San Pedro Radar
Garble Contours
for Quarter Density

APPENDIX A

ATTACHMENT 2

The following pages contain a source listing and samples of output from the dynamic, three-dimensional BCAS simulation.

```
      PROGRAM BCAS (INPUT,OUTPUT,TAPE1,TAPE6,TAPE10)
      COMMON/AIRCRF/NAC,RHO1JX(743),RHO1JY(743),ALT(743),RH1JXD(743),
     1RH1JYD(743),ALTDOT(743),RH1JXC(743),RH1JYC(743),RNGHCR(743),
     2LAC(743),MDBFCW(743),XPOW,ALTO(743),ALTSQ(743)
      COMMON/INTER/NINTS,RHO1IX(70),RHO1IY(70),INTID(70),ROTRAT(70),
     1PRP(70,8),INTRVL(70),LINT(70),AZSTRT(70),ISTAG(70)
      COMMON/BCAS/RHO1BX,RHO1BY,ALTB,RH1BXD,RH1BYD,ALTBDT,RH1BXC,RH1BYC,
     1ALTB0,RHOJBC(768),RHOIBC(70)
      COMMON/VECMAG/RHOFCN(768,70)
      COMMON/TIME/TIME,TNEXT,FRAMET,ENDTIM,ACTIME,IACUPD,FRAMSC
      COMMON/TIMEIN/TIMINT(70),TNXINT(70),TINSTR(70)
      COMMON/INPUT/COSHBW,REPROB,DPROT,BWOVR2,NTRACK
      COMMON/WINDOW/IWIN,IAZWIN(9),TWNBEG(9,3),TWNEND(9,3),TMNPRT(9),
     1TMXPRT
      COMMON/CONST/FT2NM,REARTH,TWO43E,PI,HALFPI,TWOPI,DTR,RTD,C,ONEOVC
      COMMON/SORT/SORT(2000),ISORT(2000),SORTNX(2000),ISORTX(2000)
      COMMON/REPLY/REPNOW(1000),NOWIJP(1000),NOWREP,NEXREP,REPTIM,ISAVE
      DIMENSION ISTRDL(9)
C
C*****      ESTABLISH CONSTANTS AND INITIAL VALUES OF VARIOUS PARAMETERS. READ
C*****      INPUT FILES AND PARAMETERS.
C
      TIME=0.
      TNEXT=TIME+FRAMET
      ICONT=0
      NFRAME=1
      CALL SETUP
C
C*****      UPDATE BCAS POSITION AND DETERMINE AZIMUTH WINDOWS FOR UP TO 9
C*****      INTERROGATORS OF INTEREST.
C
1     CALL WINDOW
C
C*****      IF BCAS IS NOT WITHIN AN AZIMUTH WINDOW, UPDATE TIME AND TRY AGAIN.
C
      IF (IWIN.EQ.0) GO TO 2
C
C*****      OTHERWISE CHECK FOR THE BEGINNING OF A SEQUENCE OF CONSECUTIVE
C*****      FRAMES.  IF IT IS NOT THE BEGINNING, JUMP DOWN AND DETERMINE TIME
C*****      WINDOWS FOR RELEVANT INTERROGATORS.  IF IT IS THE BEGINNING,
C*****      INITIALIZE REPLY ARRAYS, BACK UP TIME BY ONE FRAME, AND DETERMINE
C*****      INITIAL INTERROGATION TIMES.
C
      IF (ICONT.EQ.1) GO TO 4
      NOWREP=0
      NEXREP=0
      CALL MEMSET (-1.,SORT,2000)
      CALL MEMSET (-1.,SORTNX,2000)
      NFRAME=1
C
C*****      ON INITIAL FRAME, DO NOT BACK UP TO PREVIOUS FRAME.
C
      IF (TIME.EQ.0.) GO TO 13
      TNEXT=TIME
      TIME=TIME-FRAMET
C
C*****      DETERMINE INITIAL INTERROGATION TIMES, INCLUDING STAGGERED PRF.
```

```
C
13      DO 7 I=1,NINTS
        IF (ISTAG(I).EQ.1) GO TO 6
        TOTPRP=0.
        IS=ISTAG(I)
        DO 8 K=1,IS
        TOTPRP=TOTPRP+PRP(I,K)
8       CONTINUE
        TTEMP=TIME+TOTPRP-AMOD(TIME-TINSTR(I),TOTPRP)
        IF (TIME-TINSTR(I).LT.0.) TTEMP=TINSTR(I)+TIME
        DO 9 K=1,IS
        TTEST=TTEMP-PRP(I,ISTAG(I)-K+1)
        IF (TTEST.LT.TIME) GO TO 11
        TTEMP=TTEST
9       CONTINUE
        PRINT 12
12      FORMAT (* INITIAL STAGGER TIME ERROR*)
        STOP
11      TIMINT(I)=TTEMP
        INTRVL(I)=ISTAG(I)-K+1
        GO TO 7
6       TIMINT(I)=TIME+PRP(I,1)-AMOD(TIME-TINSTR(I),PRP(I,1))
        IF (TIME-TINSTR(I).LT.0.) TIMINT(I)=TINSTR(I)
7       CONTINUE
        DO 29 M=1,NTRACK
        ISTRDL(M)=0
29      CONTINUE
C
C*****       DETERMINE TIME WINDOWS FOR RELEVANT INTERROGATORS
C
4       DO 15 M=1,NTRACK
        IF (IAZWIN(M).EQ.0) GO TO 15
        IF (ISTAG(M).EQ.1) GO TO 22
        IS1=INTRVL(M)+1
        IF (IS1.GT.ISTAG(M)) IS1=1
        IS2=IS1+1
        IF (IS2.GT.ISTAG(M)) IS2=1
        IF (ISTRDL(M).EQ.0) GO TO 21
        IF (ISTRDL(M).EQ.1) GO TO 26
        ISTRDL(M)=0
        TWNBEG(M,1)=TWNBEG(M,2)
        TWNEND(M,1)=TWNEND(M,2)
        TWNBEG(M,2)=TWNBEG(M,3)
        TWNEND(M,2)=TWNEND(M,3)
        TWNBEG(M,3)=TWNBEG(M,2)+PRP(M,IS1)
        TWNEND(M,3)=TWNBEG(M,3)+TMXPRT
        IF (TIMINT(M).LT.TNEXT.AND.TWNEND(M,1).GT.TNEXT) ISTRDL(M)=1
        IF ((TIMINT(M)+PRP(M,IS1)).LT.TNEXT.AND.TWNEND(M,2).GT.TNEXT)
       1ISTRDL(M)=2
        GO TO 14
26      ISTRDL(M)=0
        IF (TIMINT(M).LT.TNEXT.AND.TWNEND(M,1).GT.TNEXT) ISTRDL(M)=1
        IF ((TIMINT(M)+PRP(M,IS1)).LT.TNEXT.AND.TWNEND(M,2).GT.TNEXT)
       1ISTRDL(M)=2
        GO TO 14
21      TWNBEG(M,1)=TIMINT(M)+TMNPRT(M)
        TWNEND(M,1)=TWNBEG(M,1)+TMXPRT
```

```
      TWNBEG(M,2)=TWNBEG(M,1)+PRP(M,IS1)
      TWNEND(M,2)=TWNBEG(M,2)+TMXPRT
      TWNBEG(M,3)=TWNBEG(M,2)+PRP(M,IS2)
      TWNEND(M,3)=TWNBEG(M,3)+TMXPRT
      IF (TIMINT(M).LT.TNEXT.AND.TWNEND(M,1).GT.TNEXT) ISTRDL(M)=1
      IF ((TIMINT(M)+PRP(M,IS1)).LT.TNEXT.AND.TWNEND(M,2).GT.TNEXT)
     1ISTRDL(M)=2
      GO TO 14
22    IF (ISTRDL(M).EQ.0) GO TO 20
      IF (ISTRDL(M).EQ.1) GO TO 27
      ISTRDL(M)=0
      TWNBEG(M,1)=TWNBEG(M,2)
      TWNEND(M,1)=TWNEND(M,2)
      TWNBEG(M,2)=TWNBEG(M,3)
      TWNEND(M,2)=TWNEND(M,3)
      TWNBEG(M,3)=TWNBEG(M,2)+PRP(M,1)
      TWNEND(M,3)=TWNBEG(M,3)+TMXPRT
      IF (TIMINT(M).LT.TNEXT.AND.TWNEND(M,1).GT.TNEXT) ISTRDL(M)=1
      IF ((TIMINT(M)+PRP(M,1)).LT.TNEXT.AND.TWNEND(M,2).GT.TNEXT)
     1ISTRDL(M)=2
      GO TO 14
27    ISTRDL(M)=0
      IF (TIMINT(M).LT.TNEXT.AND.TWNEND(M,1).GT.TNEXT) ISTRDL(M)=1
      IF ((TIMINT(M)+PRP(M,1)).LT.TNEXT.AND.TWNEND(M,2).GT.TNEXT)
     1ISTRDL(M)=2
      GO TO 14
20    TWNBEG(M,1)=TIMINT(M)+TMNPRT(M)
      TWNEND(M,1)=TWNBEG(M,1)+TMXPRT
      TWNBEG(M,2)=TWNBEG(M,1)+PRP(M,1)
      TWNEND(M,2)=TWNBEG(M,2)+TMXPRT
      TWNBEG(M,3)=TWNBEG(M,2)+PRP(M,1)
      TWNEND(M,3)=TWNBEG(M,3)+TMXPRT
      IF (TIMINT(M).LT.TNEXT.AND.TWNEND(M,1).GT.TNEXT) ISTRDL(M)=1
      IF ((TIMINT(M)+PRP(M,1)).LT.TNEXT.AND.TWNEND(M,2).GT.TNEXT)
     1ISTRDL(M)=2
14    PRINT 114,INTID(M),TIME,TNEXT,TIMINT(M),(TWNBEG(M,K),TWNEND(M,K),
     1K=1,3)
114   FORMAT (/T29,I3,3F11.7,2X,*WIN*,3(2X,2F10.6))
15    CONTINUE
      CALL FRAME
      ICONT=1
C
C*****      ORDER REPLIES CHRONOLOGICALLY BY PACKING PRE-SORTED ARRAY AND
C*****      APPLYING BUBBLE SORT
C
      IF (NOWREP.EQ.0) GO TO 18
      CALL CHRONC
C
C*****      PRINT RESULTS
C
      CALL OUTPUT
C
C*****      MOVE REPLY ARRAY FROM NEXT TO CURRENT FRAME (UNPACKED)
C
      NOWREP=NEXREP
      NEXREP=0
      CALL MOVLEV (SORTNX,SORT,4000)
```

```
      CALL MEMSET (-1.,SORTNX,2000)
C
C*****      UPDATE AIRCRAFT POSITICNS (AND RELATED PARAMETERS) AT APPROPRIATE
C*****      INTERVAL.
C
      IF (NFRAME.EQ.IACUPD) GO TO 5
      NFRAME=NFRAME+1
      GO TO 3
5     NFRAME=1
      PRINT 105,RHO1BX,RHO1BY,ALTB,(J,RHO1JX(J),RHO1JY(J),ALT(J),
     1RHOJBC(J),J=1,NAC)
105   FORMAT (1H1,*BCAS POSITION IS *3F10.2///* AIRCRAFT DATA  (NO.   X
     1  Y   ALT   RANGE FROM BCAS)*//(I4,2F8.2,F9.1,F7.2,14X,I4,2F8.2,
     2F9.1,F7.2,14X,I4,2F8.2,F9.1,F7.2))
      CALL MOVEAC
      GO TO 3
2     ICONT=0
C
C*****      UPDATE TIME AND CHECK FOR END OF SIMULATION.
C
3     TIME=TNEXT
      IF (TIME.GT.ENDTIM) GO TO 10
      TNEXT=TNEXT+FRAMET
      GO TO 1
10    ENDFILE 10
      REWIND 10
      STOP
      END
```

REFERENCE MAP (R=1)

TYPE		RELOCATION					
REAL		TIME	2717	ALT	REAL	ARRAY	AIRCRF
REAL		BCAS	5	ALTBDT	REAL		BCAS
REAL		BCAS	7204	ALTDOT	REAL	ARRAY	AIRCRF
REAL	ARRAY	AIRCRF	17757	ALT0	REAL	ARRAY	AIRCRF
REAL	ARRAY	INTER	3	BWOVR2	REAL		INPUT
REAL		CONST	0	COSHBW	REAL		INPUT
REAL		INPUT	6	DTR	REAL		CCNST
REAL		TIME	2	FRAMET	REAL		TIME
REAL		TIME	0	FT2NM	REAL		CCNST
REAL		CONST	13016	I	INTEGER		
INTEGER		TIME	1	IAZWIN	INTEGER	ARRAY	WINDOW
INTEGER			215	INTID	INTEGER	ARRAY	INTER
INTEGER	ARRAY	INTER	13020	IS	INTEGER		
INTEGER		REPLY	3720	ISORT	INTEGER	ARRAY	SORT
INTEGER	ARRAY	SORT	2033	ISTAG	INTEGER	ARRAY	INTER
INTEGER	ARRAY		13025	IS1	INTEGER		
INTEGER			0	IWIN	INTEGER		WINDOW
INTEGER			13021	K	INTEGER		

```
      SUBROUTINE WINDOW
      COMMON/BCAS/RHO1BX,RHO1BY,ALTB,RH1BXD,RH1BYD,ALTBDT,RH1BX0,RH1BY0,
     1ALTB0,RHOJEC(768),RHOIBC(70)
      COMMON/WINDOW/IWIN,IAZWIN(9),TWNBEG(9,3),TWNEND(9,3),TMNPRT(9),
     1TMXPRT
      COMMON/INTER/NINTS,RHO1IX(70),RHO1IY(70),INTID(70),ROTRAT(70),
     1PRP(70,8),INTRVL(70),LINT(70),AZSTRT(70),ISTAG(70)
      COMMON/TIME/TIME,TNEXT,FRAMET,ENDTIM,ACTIME,IACUPD,FRAMSC
      COMMON/INPUT/COSHBW,REPROB,DPROT,BWOVR2,NTRACK
      COMMON/CONST/FT2NM,REARTH,TWO43E,PI,HALFPI,TWOPI,DTR,RTD,C,ONEOVC
      COMMON/AZ/AZINT
      IWIN=0
C
C*****      COMPUTE BCAS POSITION
C
      RHO1BX=RH1BX0+RH1BXD*TIME
      RHO1BY=RH1BY0+RH1BYD*TIME
      ALTB=ALTB0+ALTBDT*TIME
      DO 10 I=1,NTRACK
      IAZWIN(I)=0
C
C*****      COMPUTE INTERROGATOR AZIMUTH
C
      AZINT=AZSTRT(I)+ROTRAT(I)*TIME
      AZX=SIN(AZINT)
      AZY=COS(AZINT)
      RHOIBX=-RHO1IX(I)+RHO1BX
      RHOIBY=-RHO1IY(I)+RHO1BY
      RHBXY2=RHOIBX*RHOIBX+RHOIBY*RHOIBY
      RHOIBC(I)=SQRT(RHBXY2+ALTB*ALTB)
      RHBCXY=SQRT(RHBXY2)
      TMNPRT(I)=RHOIBC(I)/C + 3.E-06
      CPRTAN=COS(ATAN(DPROT/RHBCXY)+BWOVR2)
      COSANG=(AZX*RHOIBX+AZY*RHOIBY)/RHBCXY
      IF (COSANG.LT.CPRTAN) GO TO 10
      IAZWIN(I)=1
      IWIN=1
   10 CONTINUE
      RETURN
      END
```

SYMBOLIC REFERENCE MAP (R=1)

TS
DOW

SN	TYPE	RELOCATION					
I	REAL	TIME	2	ALTB	REAL		BCAS
DT	REAL	BCAS	10	ALTB0	REAL		BCAS
T	REAL	AZ	1725	AZSTRT	REAL	ARRAY	INTER
	REAL		63	AZY	REAL		
VR2	REAL	INPUT	10	C	REAL		CONST
ANG	REAL		0	COSHBW	REAL		INPUT

```
      SUBROUTINE FRAME
      COMMON/AIRCRF/NAC,RHO1JX(743),RHO1JY(743),ALT(743),RH1JXD(743),
     1RH1JYD(743),ALTDOT(743),RH1JXO(743),RH1JYO(743),RNGHCR(743),
     2LAC(743),MCBPCM(743),XPOW,ALTO(743),ALTSQ(743)
      COMMON/BCAS/RHO1BX,RHO1BY,ALTB,RH1BXD,RH1BYD,ALTBDT,RH1BXO,RH1BYO,
     1ALTBS,RHOJEC(768),RHOIBC(70)
      COMMON/INTER/NINTS,RHO1IX(70),RHO1IY(70),INTID(70),ROTRAT(70),
     1PRP(70,8),INTRVL(70),LINT(70),AZSTRT(70),ISTAG(70)
      COMMON/VECMAG/RHOFCN(768,70)
      COMMON/TIME/TIME,TNEXT,FRAMET,ENDTIM,ACTIME,IACUPD,FRAMSC
      COMMON/TIMEIN/TIMINT(70),TNXINT(70),TINSTR(70)
      COMMON/INPUT/COSHBW,REPROB,DPROT,BWOVR2,NTRACK
      COMMON/CONST/FT2NM,REARTH,TWO43E,PI,HALFPI,TWOPI,DTR,RTD,C,ONEOVC
      COMMON/SORT/SORT(2000),ISORT(2000),SORTNX(2000),ISORTX(2000)
      COMMON/REPLY/REPNOW(1000),NOWIJP(1000),NOWREP,NEXREP,REPTIM,ISAVE
C
C*****      START OF MAIN INTERROGATION LOOP
C
1     DO 15 I=1,NINTS
C
C*****      IF THERE IS NO INTERROGATION THIS FRAME, GO TO NEXT INTERROGATION.
C
      IF (TIMINT(I).GE.TNEXT) GO TO 15
C
C*****      UPDATE NEXT INTERROGATION TIME, ALLOWING FOR STAGGERED PRF.
C
      IF (ISTAG(I).EQ.1) GO TO 2
      INTRVL(I)=INTRVL(I)+1
      IF (INTRVL(I).GT.ISTAG(I)) INTRVL(I)=1
2     TNXINT(I)=TIMINT(I)+PRP(I,INTRVL(I))
C
C*****      SET SECOND FRAME INTERROGATION FLAG TO APPROPRIATE VALUE.
C
      INTNO2=1
      IF (TNXINT(I).LT.TNEXT) INTNO2=2
C
C*****      CALCULATE INTERROGATOR BEAM AZIMUTH
C
      AZINT=AZSTRT(I)+ROTRAT(I)*TIME
      AZX=SIN(AZINT)
      AZY=COS(AZINT)
C
C*****      COMPUTE INTERMEDIATE VARIABLES
C
      TINTP3=TIMINT(I)+3.E-06
      TNEXP3=TNXINT(I)+3.E-06
C
C*****      START OF MAIN AIRCRAFT LOOP
C
      DO 10 J=1,NAC
C
C*****      CALCULATE DOT PRODUCT OF INTERROGATOR AZIMUTH UNIT VECTOR AND RANGE
C*****      VECTOR FROM INTERROGATOR TO AIRCRAFT.
C
      CTHETA=(AZX*(RHO1JX(J)-RHO1IX(I))+AZY*(RHO1JY(J)-RHO1IY(I)))*
     1RHOFCN(J,I)
C
```

```
C*****      IF AIRCRAFT IS NOT WITHIN INTERROGATOR MAIN BEAM, GO TO NEXT AIRCRAFT
C
      IF (CTHETA.LT.COSHBW) GO TO 10
C
C*****      IF AIRCRAFT IS NOT VISIBLE ABOVE THE HORIZON, GO TO NEXT AIRCRAFT
C
      RHOIJM=SQRT((1./(RHOFCN(J,I)*RHOFCN(J,I)))+ALTSQ(J))
      IF (RHOIJM.GE.RNGHOR(J)) GO TO 10
C
C*****      IF FIRST REPLY IS NOT MISSED DUE TO REPLY PROBABILITY, CHECK FOR A
C*****      SECOND INTERROGATION THIS FRAME.
C
      IF (RANF(DUM).LE.REPROB) GO TO 4
C
C*****      FIRST REPLY MISSED DUE TO REPLY PROBABILITY.  IF NO SECOND
C*****      INTERROGATION THIS FRAME, GO TO NEXT AIRCRAFT.
C
      IF (INTNO2.EQ.1) GO TO 10
C
C*****      OTHERWISE, CHECK FOR SECOND REPLY PROBABILITY.  IF MISSED, GO TO NEXT
C*****      AIRCRAFT.
C
      IF (RANF(DUM).GT.REPROB) GO TO 10
C
C*****      OTHERWISE, COMPUTE ARRIVAL TIME FOR SECOND REPLY AND STORE IN
C*****      APPROPRIATE ARRAY.
C
      REPTIM=TNEXP3+(RHOIJM+RHOJBC(J))*ONEOVC
      IF (REPTIM.GE.TNEXT) GO TO 3
      ISAVE=LINT(I)+MDBPOW(J)
      CALL SRTNOW
      GO TO 10
 3    ISAVE=LINT(I)+MDBPOW(J)
      CALL SRTNEX
      GO TO 10
C
C*****      FIRST REPLY IS OK.  LOOK FOR A SECOND INTERROGATION THIS FRAME.
C
 4    IF (INTNO2.EQ.1) GO TO 8
C
C*****      SECOND INTERROGATION OCCURS LATER THIS FRAME.  COMPUTE FIRST REPLY
C*****      ARRIVAL TIME.
C
      REPTIM=TINTP3+(RHOIJM+RHOJBC(J))*ONEOVC
      IF (REPTIM.GE.TNEXT) GO TO 7
C
C*****      FIRST REPLY ARRIVAL OCCURS THIS FRAME.  STORE ACCORDINGLY.
C
      ISAVE=LINT(I)+MDBPOW(J)
      CALL SRTNOW
C
C*****      CHECK FOR SECOND REPLY PROBABILITY.  IF MISSED, GO TO NEXT AIRCRAFT.
C
      IF (RANF(DUM).GT.REPROB) GO TO 10
C
C*****      OTHERWISE, COMPUTE ARRIVAL TIME FOR SECOND REPLY AND STORE IN
C*****      APPROPRIATE ARRAY.
```

```
C
      REPTIM=REPTIM+PRP(I,INTRVL(I))
      IF (REPTIM.GE.TNEXT) GO TO 5
      ISAVE=LINT(I)+MDBPOW(J)
      CALL SRTNOW
      GO TO 10
5     ISAVE=LINT(I)+MDBPOW(J)
      CALL SRTNEX
      GO TO 10
C
C*****      FIRST OF TWO REPLIES OCCURS IN NEXT FRAME.  STORE ACCORDINGLY.
C
7     ISAVE=LINT(I)+MDBPOW(J)
      CALL SRTNEX
C
C*****      CHECK FOR SECOND REPLY PROBABILITY.  IF MISSED, GO TO NEXT AIRCRAFT.
C
      IF (RANF(DUM).GT.REPROB) GO TO 10
C
C*****      OTHERWISE, COMPUTE ARRIVAL TIME FOR SECOND REPLY AND STORE IN NEXT
C*****      FRAME ARRAY.
C
      REPTIM=REPTIM+PRP(I,INTRVL(I))
      ISAVE=LINT(I)+MDBPOW(J)
      CALL SRTNEX
      GO TO 10
C
C*****      ONLY ONE INTERROGATION OCCURS THIS FRAME.  COMPUTE RESULTING REPLY
C*****      ARRIVAL TIME AND STORE ACCORDINGLY.
C
8     REPTIM=TINTP3+(RHOIJM+RHOJBC(J))*ONEOVC
      IF (REPTIM.LT.TNEXT) GO TO 9
      ISAVE=LINT(I)+MDBPOW(J)
      CALL SRTNEX
      GO TO 10
9     ISAVE=LINT(I)+MDBPOW(J)
      CALL SRTNOW
10    CONTINUE
C
C*****      UPDATE INTERROGATION TIME
C
      IF (INTNO2.EQ.1) GO TO 11
      IF (ISTAG(I).EQ.1) GO TO 12
      INTRVL(I)=INTRVL(I)+1
      IF (INTRVL(I).GT.ISTAG(I)) INTRVL(I)=1
12    TNXINT(I)=TNXINT(I)+PRP(I,INTRVL(I))
11    TIMINT(I)=TNXINT(I)
C
C*****      IF REPLY ARRAY EXCEEDS 900 ELEMENTS, PRINT WARNING.
C
      IF (NOWREP.GT.900) PRINT 101
101   FORMAT (* WARNING - REPLY ARRAY (REPNOW) EXCEEDS 900 ELEMENTS.*)
15    CONTINUE
      RETURN
      END
```

```
      SUBROUTINE SETUP
      COMMON/AIRCRF/NAC,RHO1JX(743),RHO1JY(743),ALT(743),RH1JXD(743),
     1RH1JYD(743),ALTDOT(743),RH1JXC(743),RH1JYJ(743),RNGHOR(743),
     2LAC(743),MCBPOW(743),XPOW,ALT0(743),ALTSQ(743)
      COMMON/BCAS/RHO1BX,RHO1BY,ALTB,RH1BXD,RH1BYD,ALTBDT,RH1BX0,RH1BY0,
     1ALTB0,RHOJEC(768),RHOIBC(70)
      COMMON/INTER/NINTS,RHO1IX(70),RHO1IY(70),INTID(70),ROTRAT(70),
     1PRP(70,8),INTRVL(70),LINT(70),AZSTRT(70),ISTAG(70)
      COMMON/WINDOW/IWIN,IAZWIN(9),TWNBEG(9,3),TWNEND(9,3),TMNPRT(9),
     1TMXPRT
      COMMON/TIME/TIME,TNEXT,FRAMET,ENDTIM,ACTIME,IACUPD,FRAMSC
      COMMON/TIMEIN/TIMINT(70),TNXINT(70),TINSTR(70)
      COMMON/INPUT/COSHBW,REPROB,DPROT,BWOVR2,NTRACK
      COMMON/CONST/FT2NM,REARTH,TWO43E,PI,HALFPI,TWOPI,DTR,RTD,C,ONEOVC
      COMMON/SORT/SORT(2000),ISORT(2000),SORTNX(2000),ISORTX(2000)
      COMMON/REPLY/REPNOW(1000),NOWIJP(1000),NOWREP,NEXREP,REPTIM,ISAVE
      DIMENSION LAT(75,3),LONG(75,3),CAR(3),AOUT(3)
      NAC=743
      FT2NM=1./6076.12
      REARTH=3437.747
      TWO43E=2.*(4./3.)*REARTH
      PI=3.1415926535898
      HALFPI=0.5*PI
      TWOPI=2.*PI
      DTR=PI/180.
      RTD=180./PI
      C=161875.
      ONEOVC=1./C
      READ 1,FRAMET,ENDTIM,NTRACK,IACUPD,REPROB,BMWDTH,DISCIN,XPOW,
     1DPROT,RH1BX0,RH1BY0,ALTB0,RH1BXD,RH1BYD,ALTBDT
    1 FORMAT (2F10.0,2I5,5F10.0/6F10.0)
      PRINT 200,TIME,FRAMET,ENDTIM,RH1BX0,RH1BY0,ALTB0,RH1BXD,RH1BYD,
     1ALTBDT,NAC,IACUPD,XPOW,REPROB,DISCIN,BMWDTH
      PRINT 201,NTRACK,DPROT
  200 FORMAT (T52,*BCAS SIMULATION INPUT PARAMETERS*/////6H *****,*TIME*
     16H *****//T57,*START TIME =*F11.7/T57,*FRAME TIME =*F11.7/T59,
     2*END TIME =*F11.7///6H *****,*GEOMETRY*,6H *****//
     3* THE CARTESIAN FRAME USED THROUGHOUT THIS FLAT-EARTH SIMULATION I
     4S CENTERED AT INTERROGATOR NO. 1 WITH X EAST, Y NORTH, AND Z UP.*/
     5* A CALCULATION IS PERFORMED TO DISCOUNT AIRCRAFT THAT WOULD BE OV
     6ER THE RADAR HORIZON IN A SPHERICAL-EARTH MODEL.*///6H *****BCAS*
     76H *****//* BCAS AIRCRAFT POSITION (NM,NM,FT) AND VELOCITY (KT,KT,
     8FPM) AT TIME=0 ARE*/* X =*F7.2,*,    Y =*F7.2,*,    Z =*F8.1,*,  XD
     9OT =*F6.1,*,   YDOT =*F6.1,*,   ZDOT =*F7.1,*.*///6H *****,* TARGE
     1T AIRCRAFT*,6H *****//I4,* TARGET AIRCRAFT POSITIONS WILL BE UPDAT
     2ED EVERY*I3,* FRAMES.   (POSITIONS ARE LISTED ON SUBSEQUENT PAGES.
     3)*/* ALL AIRCRAFT ARE ASSUMED TO BE EQUIPPED WITH TRANSPONDERS THA
     4T RADIATE *F4.0,* WATTS OF POWER WITH NO ATTENUATION OTHER THAN A*
     5/* RANGE-DEPENDENT PROPAGATION LOSS.  THE TRANSPONDERS HAVE A REPL
     6Y PROBABILITY OF *F4.2,*.*///6H *****,*INTERROGATORS*,6H *****//
     7* UP TO 70 INTERROGATORS WITHIN *,F4.0,* NM OF INTERROGATOR NO. 1
     8ARE INCLUDED IN THE SIMULATION.  THEIR INTERROGATION BEAMWIDTHS*/
     9* ARE *F3.1,* DEGREES, AND THE REST OF THEIR CHARACTERISTICS ARE D
     1ESCRIBED ON THE NEXT PAGE.*///)
  201 FORMAT (                        6H *****,*REPLY WINDOWS*,6H *****//
     2* THE FIRST *I1,* INTERROGATORS ARE TRACKED TO DETERMINE AZIMUTH A
     3ND TIME WINDOWS WITHIN WHICH AIRCRAFT REPLIES ARE EXAMINED.*/
```

```
     4* THE CALCULATION OF THESE WINDOWS ASSUMES A PROTECTED RANGE OF UF
     5 TO *F4.0,* NM FROM THE BCAS-EQUIPPED AIRCRAFT.*)
      TMXPRT=2.*CPROT/C
      IF (NTRACK.LE.9) GO TO 9
      PRINT 109
109   FORMAT (* NTRACK EXCEEDS 9*)
      STOP
9     CONTINUE
      RH1BXD=RH1EXD/3600.
      RH1BYD=RH1EYD/3600.
      RHO1BX=RH1EX0+RH1BXD*TIME
      RHO1BY=RH1EY0+RH1BYD*TIME
C
C*****       CONVERT BCAS VELOCITY INPUTS FROM KTS TO NM/SEC (ALTITUDE FRCM FPM
C*****       TO NM/SEC.
C
      ALTBDT=ALTBDT*FT2NM/60.
      ALTB0=ALTB0*FT2NM
      ALTB=ALTB0+ALTBDT*TIME
      CALL PAGE
      PRINT 16
16    FORMAT (T3,*I*,T7,*ID*,T14,*LAT*,T25,*LONG*,T34,*SCAN*,T43,*AZ(0)*
     1,T53,*BANG(0)*,T72,*PULSE REPETITION RATE*,T103,*RHO1IX*,T113,
     2,*RHO1IY*,T124,*RANGE*/)
      I=1
17    READ 2,INTID(I),(LAT(I,K),K=1,3),(LONG(I,L),L=1,3),ROTRAT(I),
     1(PRP(I,M),M=1,8)
2     FORMAT (I10,1X,3I3,1X,3I3,F10.0,8F5.0)
      IF (INTID(I).EQ.0) GO TO 3
      XLAT1=(33.+55./60.+57./3600.)*DTR
      XLONG1=TWOPI-(118.+24./60.+23./3600.)*DTR
      CALL LL2CAR (XLAT1,XLONG1,0.,CAR)
      ANG=HALFPI+XLONG1
      CALL ROTZ (CAR,ANG,AOUT)
      ANG=HALFPI-XLAT1
      CALL ROTX (AOUT,ANG,CAR)
      R1X=CAR(1)
      R1Y=CAR(2)
      XLAT    =(FLOAT(LAT(I,1))+FLOAT(LAT(I,2))/60.+FLOAT(LAT(I,3))/3600.
     1)*DTR
      XLONG   =TWOPI-(FLOAT(LONG(I,1))+FLOAT(LONG(I,2))/60.+
     1FLOAT(LONG(I,3))/3600.)*DTR
      CALL LL2CAR (XLAT,XLONG,0.,CAR)
      ANG=HALFPI+XLONG1
      CALL ROTZ(CAR,ANG,AOUT)
      ANG=HALFPI-XLAT1
      CALL ROTX(AOUT,ANG,CAR)
19    RHO1IX(I)=CAR(1)-R1X
      RHO1IY(I)=CAR(2)-R1Y
      RNGINT=SQRT(RHO1IX(I)**2+RHO1IY(I)**2)
      IF (RNGINT.GE.DISCIN) GO TO 17
      INTRVL(I)=1
      TINSTR(I)=RANF(DUM)*FRAMET
      TIMINT(I)=TINSTR(I)
      LINT(I)=INTID(I)*(2**30)
      AZSTRT(I)=RANF(DUM)*360.
      PRINT 18,I,INTID(I),(LAT(I,K),K=1,3),(LONG(I,L),L=1,3),ROTRAT(I),
```

```
      1AZSTRT(I),TINSTR(I),(PRP(I,M),M=1,3),RHO1IX(I),RHO1IY(I),PNGINT
 18   FORMAT (1X,I2,2X,I3,2X,3I3,1X,1X,3I3,3X,F4.1,3X,2X,F5.1,3X,1X,F8.6
     1,1X,8F5.0,2X,F6.1,2X,2X,F6.1,2X,2X,F6.1)
      ROTRAT(I)=ROTRAT(I)*TWOPI/60.
      AZSTRT(I)=AZSTRT(I)*DTR
      IF (PRP(I,2).EQ.0.) GO TO 10
      ISTAG(I)=8
      IF (PRP(I,7).EQ.0.) ISTAG(I)=6
      GO TO 11
 10   ISTAG(I)=1
 11   IS=ISTAG(I)
      DO 13 M=1,IS
      PRP(I,M)=1./PRP(I,M)
 13   CONTINUE
      I=I+1
      IF (I.LE.70) GO TO 17
      PRINT 103
 103  FORMAT (//6H *****,* WARNING - INTERROGATOR LIMIT OF 70 HAS BEEN R
     1EACHED.*//)
 3    NINTS=I-1
      IF (NINTS.GT.0) GO TO 5
      PRINT 4
 4    FORMAT (*1NO INTERROGATORS SPECIFIED.*)
      STOP
 5    ACTIME=FLOAT(IACUPD)*FRAMET
      FRAMSC=1000./FRAMET
      BWOVR2=DTR*0.5*BMWDTH
      COSHBW=COS(BWOVR2)
C
C*****      TEMPORARY REDUCTION TO 1 INTERROGATOR (FIRST)
C
      NINTS=1
      CALL BASIN
      XPOW=XPOW*(C/(4.*1090.E+06*PI))**2
      DO 22 J=1,NAC
      RHOJBC(J)=SQRT((RHO1BX-RHO1JX(J))**2+(RHO1BY-RHO1JY(J))**2+
     1(ALTB-ALT(J))**2)
      LAC(J)=J*(2**20)
      MDBPOW(J)=ABS(3000.+1000.*ALOG10(XPOW/(RHOJBC(J)**2)))
      IF(IABS(MDBPOW(J)).GT.(2**20-1))MDBPOW(J)=ISIGN(2**20-1,MDBPOW(J))
      MDBPOW(J)=MDBPOW(J)+LAC(J)
 22   CONTINUE
      RETURN
      END
```

REFERENCE MAP (R=1)

N TYPE	RELOCATION					
REAL	TIME	2717	ALT	REAL	ARRAY	AIRCRF
REAL	BCAS	5	ALTBDT	REAL		BCAS

```
      SUBROUTINE BASIN
      COMMON/AIRCRF/NAC,RHO1JX(743),RHO1JY(743),ALT(743),RH1JXD(743),
     1RH1JYD(743),ALTDOT(743),RH1JX0(743),RH1JY0(743),RNGHOR(743),
     2LAC(743),MDBPOW(743),XPOW,ALT0(743),ALTSQ(743)
      COMMON/INTER/NINTS,RHO1IX(70),RHO1IY(70),INTID(70),ROTRAT(70),
     1PRP(70,8),INTRVL(70),LINT(70),AZSTRT(70),ISTAG(70)
      COMMON/VECMAG/RHOFCN(768,70)
      COMMON/TIME/TIME,TNEXT,FRAMET,ENDTIM,ACTIME,IACUPD,FRAMSC
      COMMON/CONST/FT2NM,REARTH,TWO43E,PI,HALFPI,TWOPI,DTR,RTD,C,ONEOVC
      DO 5 J=1,NAC
      READ(1,2)RH1JX0(J),RH1JY0(J),ALT0(J),RH1JXD(J),RH1JYD(J),ALTDOT(J)
2     FORMAT (12X,4(1X,E14.7)/2(E14.7,1X))
      READ (1)
      ALT0(J)=ALT0(J)*FT2NM
      ALTDOT(J)=ALTDOT(J)*FT2NM
      ALT(J)=ALT0(J)+ALTDOT(J)*TIME
      ALTSQ(J)=ALT(J)*ALT(J)
      RNGHOR(J)=SQRT(TWO43E*ALT(J))
      RHO1JX(J)=RH1JX0(J)+RH1JXD(J)*TIME
      RHO1JY(J)=RH1JY0(J)+RH1JYD(J)*TIME
3     DO 5 I=1,NINTS
      RHOFCN(J,I)=1./SQRT((RHO1JX(J)-RHO1IX(I))**2
     1+(RHO1JY(J)-RHO1IY(I))**2)
5     CONTINUE
      RETURN
      END
```

REFERENCE MAP (R=1)

TYPE		RELOCATION					
REAL		TIME	2717	ALT	REAL	ARRAY	AIRCRF
REAL	ARRAY	AIRCRF	21326	ALTSQ	REAL	ARRAY	AIRCRF
REAL	ARRAY	AIRCRF	1725	AZSTRT	REAL	ARRAY	INTER
REAL		CONST	6	DTR	REAL		CONST
REAL		TIME	2	FRAMET	REAL		TIME
REAL		TIME	0	FT2NM	REAL		CONST
REAL		CONST	107	I	INTEGER		
INTEGER		TIME	215	INTID	INTEGER	ARRAY	INTER
INTEGER	ARRAY	INTER	2033	ISTAG	INTEGER	ARRAY	INTER
INTEGER			15040	LAC	INTEGER	ARRAY	AIRCRF
INTEGER	ARRAY	INTER	16407	MDBPOW	INTEGER	ARRAY	AIRCRF
INTEGER		AIRCRF	0	NINTS	INTEGER		INTER
REAL		CONST	3	PI	REAL		CONST
REAL	ARRAY	INTER	1	REARTH	REAL		CONST
REAL	ARRAY	VECMAG	1	RHO1IX	REAL	ARRAY	INTER
REAL	ARRAY	INTER	1	RHO1JX	REAL	ARRAY	AIRCRF
REAL	ARRAY	AIRCRF	4266	RH1JXD	REAL	ARRAY	AIRCRF
REAL	ARRAY	AIRCRF	5635	RH1JYD	REAL	ARRAY	AIRCRF
REAL	ARRAY	AIRCRF	13471	RNGHOR	REAL	ARRAY	AIRCRF
REAL	ARRAY	INTER	7	RTD	REAL		CONST

```
      SUBROUTINE MOVEAC
      COMMON/AIRCRF/NAC,RHO1JX(743),RHO1JY(743),ALT(743),RH1JXD(743),
     1RH1JYD(743),ALTDOT(743),RH1JX0(743),RH1JY0(743),RNGHOR(743),
     2LAC(743),MDBPOW(743),XPOW,ALT0(743),ALTSQ(743)
      COMMON/BCAS/RHO1BX,RHO1BY,ALTB,RH1BXD,RH1BYD,ALTBDT,RH1BX0,RH1BY0,
     1ALTB0,RHOJBC(768),RHOIBC(70)
      COMMON/INTER/NINTS,RHO1IX(70),RHO1IY(70),INTID(70),ROTRAT(70),
     1PRP(70,8),INTRVL(70),LINT(70),AZSTRT(70),ISTAG(70)
      COMMON/TIME/TIME,TNEXT,FRAMET,ENDTIM,ACTIME,IACUPD,FRAMSC
      COMMON/VECMAG/RHOFCN(768,70)
      COMMON/CONST/FT2NM,REARTH,TWO43E,PI,HALFPI,TWOPI,DTR,RTD,C,ONEOVC
      DO 4 J=1,NAC
      RHO1JX(J)=RH1JX0(J)+RH1JXD(J)*TIME
      RHO1JY(J)=RH1JY0(J)+RH1JYD(J)*TIME
      IF (ALTDOT(J).EQ.0.) GO TO 3
      ALT(J)=ALT0(J)+ALTDOT(J)*TIME
      ALTSQ(J)=ALT(J)*ALT(J)
      RNGHOR(J)=SQRT(TWO43E*ALT(J))
      IF (ALT(J).LE..01) ALTDOT(J)=-ALTDOT(J)
    3 CONTINUE
      RHOJBC(J)=SQRT((RHO1BX-RHO1JX(J))**2+(RHO1BY-RHO1JY(J))**2+
     1(ALTB-ALT(J))**2)
      MDBPOW(J)=ABS(3000.+1000.*ALOG10(XPOW/(RHOJBC(J)**2)))
      IF(IABS(MDBPOW(J)).GT.(2**20-1))MDBPOW(J)=ISIGN(2**20-1,MDBPOW(J))
      MDBPOW(J)=MDBPOW(J)+LAC(J)
    4 CONTINUE
      DO 5 I=1,NINTS
      DO 5 J=1,NAC
      RHOFCN(J,I)=1./SQRT((RHO1JX(J)-RHO1IX(I))**2
     1+(RHO1JY(J)-RHO1IY(I))**2)
    5 CONTINUE
      RETURN
      END
```

RIC REFERENCE MAP (R=1)

SN TYPE		RELOCATION					
REAL		TIME	2717	ALT	REAL	ARRAY	AIRCRF
REAL		BCAS	5	ALTBDT	REAL		BCAS
REAL		BCAS	7204	ALTDOT	REAL	ARRAY	AIRCRF
REAL	ARRAY	AIRCRF	17757	ALT0	REAL	ARRAY	AIRCRF
REAL	ARRAY	INTER	10	C	REAL		CONST
REAL		CONST	3	ENDTIM	REAL		TIME
REAL		TIME	6	FRAMSC	REAL		TIME
REAL		CONST	4	HALFPI	REAL		CONST
INTEGER			5	IACUPD	INTEGER		TIME
INTEGER	ARRAY	INTER	1511	INTRVL	INTEGER	ARRAY	INTER
INTEGER	ARRAY	INTER	117	J	INTEGER		
INTEGER	ARRAY	AIRCRF	1617	LINT	INTEGER	ARRAY	INTER
INTEGER	ARRAY	AIRCRF	0	NAC	INTEGER		AIRCRF

```
      SUBROUTINE SRTNOW
C
C*****     CURRENT FRAME REPLY PRE-SORT
C
      COMMON/WINDOW/IWIN,IAZWIN(9),TWNBEG(9,3),TWNEND(9,3),TMNPRT(9),
     1TMXPRT
      COMMON/SORT/SORT(2000),ISORT(2000),SORTNX(2000),ISORTX(2000)
      COMMON/REPLY/REPNOW(1000),NOWIJP(1000),NOWREP,NEXREP,REPTIM,ISAVE
      COMMON/TIME/TIME,TNEXT,FRAMET,ENDTIM,ACTIME,IACUPD,FRAMSC
      COMMON/INPUT/COSHBW,REPROB,DPROT,BWOVR2,NTRACK
      ITRK=0
      DO 4 M=1,NTRACK
      IF (IAZWIN(M).EQ.0) GO TO 4
      IF (TWNBEG(M,1).LE.REPTIM.AND.REPTIM.LE.TWNEND(M,1)) GO TO 5
      IF (TWNBEG(M,2).LE.REPTIM.AND.REPTIM.LE.TWNEND(M,2)) GO TO 5
      GO TO 4
5     ITRK=ITRK+1
      IF (ITRK.GT.5) GO TO 4
      ISAVE=ISAVE.OR.SHIFT(M,36+4*ITRK)
4     CONTINUE
      IF (ITRK.EQ.0) RETURN
      NOWREP=NOWREP+1
      K=(REPTIM-TIME)*FRAMSC+1.
      IF (SORT(K).LT.0.) GO TO 2
      DO 1 M=1,2000
      K=K+1
      IF (K.GT.2000) K=1
      IF (SORT(K).LT.0.) GO TO 2
1     CONTINUE
      PRINT 3
3     FORMAT (* PRESORT ERROR*)
      STOP
2     SORT(K)=REPTIM
      ISORT(K)=ISAVE
      RETURN
      END
```

LIC REFERENCE MAP (R=1)

V

SN	TYPE		RELOCATION					
E	REAL		TIME	3	BWOVR2	REAL		INPUT
V	REAL		INPUT	2	DPROT	REAL		INPUT
M	REAL		TIME	2	FRAMET	REAL		TIME
C	REAL		TIME	5	IACUPD	INTEGER		TIME
A	INTEGER	ARRAY	WINDOW	3723	ISAVE	INTEGER		REPLY
	INTEGER	ARRAY	SOPT	13560	ISORTX	INTEGER	ARRAY	SCRT
	INTEGER			0	IWIN	INTEGER		WINDOW
	INTEGER			61	M	INTEGER		
P	INTEGER		REPLY	1750	NOWIJP	INTEGER	ARRAY	REPLY
P	INTEGER		PEPLY	4	NTRACK	INTEGER		INPUT

```
      SUBROUTINE SRTNEX
C
C*****      NEXT FRAME REPLY PRE-SORT
C
      COMMON/WINDOW/IWIN,IAZWIN(9),TWNBEG(9,3),TWNEND(9,3),TMNPRT(9),
     1TMXPRT
      COMMON/SORT/SORT(2000),ISORT(2000),SORTNX(2000),ISORTX(2000)
      COMMON/REPLY/REPNOW(1000),NOWIJP(1000),NOWREP,NEXREF,REPTIM,ISAVE
      COMMON/TIME/TIME,TNEXT,FRAMET,ENDTIM,ACTIME,IACUPD,FRAMSC
      COMMON/INPUT/COSHBW,REPROB,DPROT,BWOVR2,NTRACK
      ITRK=0
      DO 4 M=1,NTRACK
      IF (IAZWIN(M).EQ.0) GO TO 4
      IF (TWNBEG(M,1).LE.REPTIM.AND.REPTIM.LE.TWNEND(M,1)) GO TO 5
      IF (TWNBEG(M,2).LE.REPTIM.AND.REPTIM.LE.TWNEND(M,2)) GO TO 5
      IF (TWNBEG(M,3).LE.REPTIM.AND.REPTIM.LE.TWNEND(M,3)) GO TO 5
      GO TO 4
5     ITRK=ITRK+1
      IF (ITRK.GT.5) GO TO 4
      ISAVE=ISAVE.OR.SHIFT(M,36+4*ITRK)
4     CONTINUE
      IF (ITRK.EQ.0) RETURN
      NEXREP=NEXREP+1
      K=(REPTIM-TIME)*FRAMSC+1.
      IF (SORTNX(K).LT.0.) GO TO 2
      DO 1 M=1,2000
      K=K+1
      IF (K.GT.2000) K=1
      IF (SORTNX(K).LT.0.) GO TO 2
1     CONTINUE
      PRINT 3
3     FORMAT (* PRESORT ERROR*)
      STOP
2     SORTNX(K)=REPTIM
      ISORTX(K)=ISAVE
      RETURN
      END
```

SYMBOLIC REFERENCE MAP (R=1)

TS
NEX

SN	TYPE		RELOCATION					
TIME	REAL		TIME	3	BWOVR2	REAL		INPUT
SHBW	REAL		INPUT	2	DPROT	REAL		INPUT
DTIM	REAL		TIME	2	FRAMET	REAL		TIME
AMSC	REAL		TIME	5	IACUPD	INTEGER		TIME
ZWIN	INTEGER	ARRAY	WINDOW	3723	ISAVE	INTEGER		REPLY
ORT	INTEGER	ARRAY	SORT	13560	ISORTX	INTEGER	ARRAY	SORT
RK	INTEGER			0	IWIN	INTEGER		WINDOW
	INTEGER			64	M	INTEGER		
XREP	INTEGER		REPLY	1750	NOWIJP	INTEGER	ARRAY	REPLY

```
      SUBROUTINE CHRONO
      COMMON/SORT/SORT(2000),ISORT(2000),SORTNX(2000),ISORTX(2000)
      COMMON/REPLY/REPNOW(1000),NOWIJP(1000),NOWREP,NEXREP,REPTIM,ISAVE
C
C*****       PACK PRE-SORTED ARRAY
C
      K=0
      DO 2 I=1,NOWREP
1     K=K+1
      IF (SORT(K).LT.0.) GO TO 1
      REPNOW(I)=SORT(K)
      NOWIJP(I)=ISORT(K)
2     CONTINUE
C
C*****       FINAL BUBBLE SORT
C
      M=NOWREP-1
      IF (M.LE.0) RETURN
      DO 6 L=1,M
      K=NOWREP-L
      SWAP=-1.
      DO 5 I=1,K
      IF (REPNOW(I).LE.REPNOW(I+1)) GO TO 5
      SWAP=REPNOW(I)
      REPNOW(I)=REPNOW(I+1)
      REPNOW(I+1)=SWAP
      ISWAP=NOWIJP(I)
      NOWIJP(I)=NOWIJP(I+1)
      NOWIJP(I+1)=ISWAP
5     CONTINUE
      IF (SWAP) 10,6,6
6     CONTINUE
10    RETURN
      END
```

OLIC REFERENCE MAP (R=1)

S
NO

SN	TYPE		RELOCATION					
	INTEGER			3723	ISAVE	INTEGER		REPLY
I	INTEGER	ARRAY	SORT	13560	ISORTX	INTEGER	ARRAY	SORT
P	INTEGER			34	K	INTEGER		
	INTEGER			36	M	INTEGER		
EP	INTEGER		REPLY	1750	NOWIJP	INTEGER	ARRAY	REPLY
EP	INTEGER		REPLY	0	REPNOW	REAL	ARRAY	REPLY
IM	REAL		REPLY	0	SORT	REAL	ARRAY	SORT
NX	REAL	ARRAY	SORT	40	SWAP	REAL		

ABELS

```
0  2                                   26  5
31  10
```

AD-A061 948 FEDERAL AVIATION ADMINISTRATION WASHINGTON D C OFFIC--ETC F/G 17/7
FAA BCAS CONCEPT. VOLUME IIIA. APPENDICES A-E,(U)
APR 78 E J KOENKE
UNCLASSIFIED FAA-EM-78-5-III-A NL

2 OF 5
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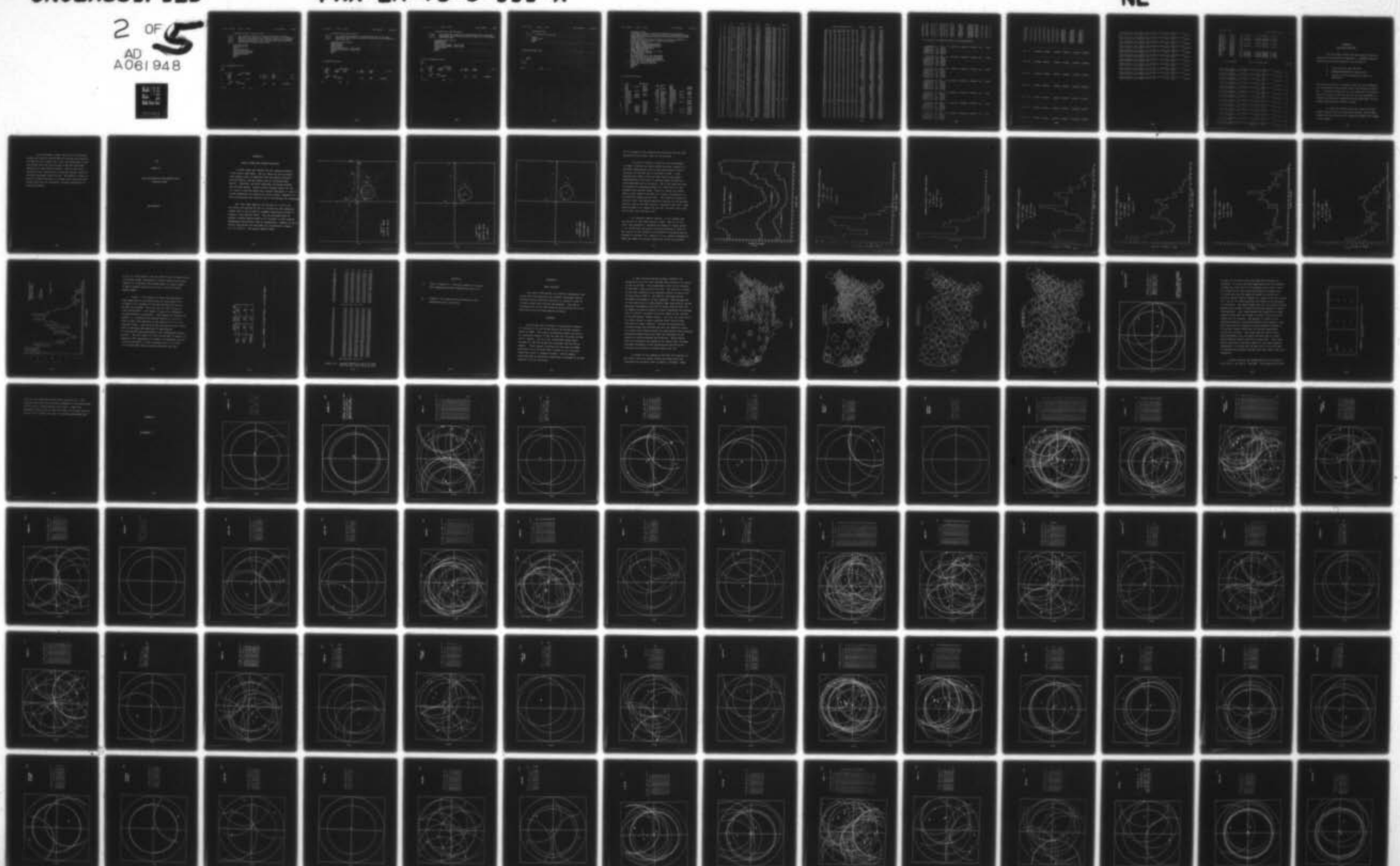

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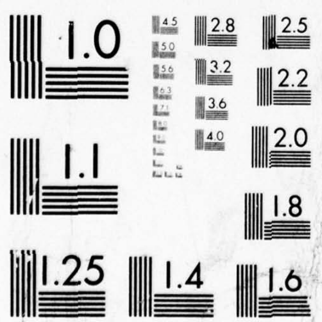


MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

```
      SUBROUTINE LL2CAR (RLAT,RLON,H,CAR)
C
C*****    THIS SUBROUTINE CONVERTS A POSITION SPECIFIED AS LATITUDE,
C*****    LONGITUDE, AND HEIGHT ABOVE A SPHERICAL EARTH TO EARTH-CENTERED
C*****    CARTESIAN COORDINATES (X-AXIS ALONG INTERSECTION OF GREENWICH
C*****    MERIDIAN WITH EQUATORIAL PLANE, Z-AXIS ALONG NORTH POLAR AXIS,
C*****    Y-AXIS COMPLETES RIGHT-HANDED TRIAD).
C
      DIMENSION CAR(3)
      DATA RE/3437.747/
      R=RE+H
      RCLAT=R*COS(RLAT)
      CAR(1)=RCLAT*COS(RLON)
      CAR(2)=RCLAT*SIN(RLON)
      CAR(3)=R*SIN(RLAT)
      RETURN
      END
```

```
MBOLIC REFERENCE MAP (R=1)

NTS
2CAR

     SN  TYPE          RELOCATION
R        REAL     ARRAY    F.P.          0  H        REAL        F.P.
         REAL                           27  RCLAT    REAL
         REAL                            0  RLAT     REAL        F.P.
ON       REAL              F.P.

         TYPE     ARGS
S        REAL     1 LIBRARY                 SIN      REAL     1 LIBRARY

S
 LENGTH                   30B     24
```

```
      SUBROUTINE RCTX (AIN,ANG,AOUT)
C
C*****     THIS SUBROUTINE COMPUTES THE TRANSFORMATION ACUT OF THE INPUT
C*****     COORDINATES AIN BY ROTATING POSITIVELY ABOUT THE X-AXIS THROUGH THE
C*****     INPUT ANGLE ANG.
C
      DIMENSION AIN(3),AOUT(3)
      SANG=SIN(ANG)
      CANG=COS(ANG)
      AOUT(1)=AIN(1)
      AOUT(2)=AIN(2)*CANG + AIN(3)*SANG
      AOUT(3)=AIN(3)*CANG - AIN(2)*SANG
      RETURN
      END
```

IC REFERENCE MAP (R=1)

```
SN  TYPE               RELCCATION
    REAL       ARRAY     F.P.            0  ANG        REAL                 F.P.
    REAL       ARRAY     F.P.           22  CANC       REAL
    REAL

      TYPE   ARGS
    REAL       1 LIBRARY                    SIN        REAL        1 LIBRARY

GTH                  238        19
```

```
      SUBROUTINE ROTZ (AIN,ANG,AOUT)
C
C*****     THIS SUBROUTINE COMPUTES THE TRANSFORMATION ACUT OF THE INPUT
C*****     COORDINATES AIN BY ROTATING POSITIVELY ABOUT THE Z-AXIS THROUGH
C*****     INPUT ANGLE ANG.
C
      DIMENSION AIN(3),AOUT(3)
      SANG=SIN(ANG)
      CANG=COS(ANG)
      AOUT(1)=AIN(1)*CANG + AIN(2)*SANG
      AOUT(2)=AIN(2)*CANG - AIN(1)*SANG
      AOUT(3)=AIN(3)
      RETURN
      END
```

```
SYMBOLIC REFERENCE MAP (R=1)

INTS
OTZ

     SN  TYPE              RELCCATION
IN       REAL        ARRAY    F.P.            0  ANG        REAL              F.P.
OUT      REAL        ARRAY    F.P.           22  CANG       REAL
NG       REAL

         TYPE      ARGS
S        REAL        1 LIBRARY                   SIN        REAL        1 LIBRARY

S
 LENGTH                  23B      19
```

```
      SUBROUTINE PAGE
C
C*****       GO TO TOP OF NEXT PAGE
C
      PRINT 1
1     FORMAT (1H1)
      RETURN
      END
```

CLIC REFERENCE MAP (R=1)

S

```
        MODE
UT    FMT

ABELS
    FMT

ENGTH              12B      10
```

```
      SUBROUTINE OUTPUT
      COMMON/SORT/SORT(2000),ISORT(2000),SORTNX(2000),ISORTX(2000)
      COMMON/REPLY/REPNOW(1000),NOWIJP(1000),NOWREP,NEXREP,REPTIM,ISAVE
      COMMON/CONST/FT2NM,REARTH,TWO43E,PI,HALFPI,TWOPI,DTR,RTD,C,ONEOVC
      COMMON/AZ/AZINT
      COMMON/INTER/NINTS,RHO1IX(70),RHO1IY(70),INTID(70),ROTRAT(70),
     1PRP(70,8),INTRVL(70),LINT(70),AZSTRT(70),ISTAG(70)
      DIMENSION KTRACK(5)
      DATA MASK4 /00000000000000000017B/
      DATA MASK10/00000000000000001777B/
      DATA MASK20/00000000000003777777B/
      AZOUT=AMOD(AZINT*RTD,360.)
      PRINT 5,NOWREP,AZOUT
    5 FORMAT (1H+,I5,* REPLIES, AZ =*F6.1)
      IF (NOWREP.EQ.0) RETURN
      DO 2 I=1,NOWREP
      IOUT=SHIFT(NOWIJP(I),-30).AND.MASK10
      JOUT=SHIFT(NOWIJP(I),-20).AND.MASK10
      POW=-.01*FLOAT(NOWIJP(I).AND.MASK20)
      PRINT 1,REPNOW(I),INTID(IOUT),JOUT,POW
    1 FORMAT (1H ,F10.6,I4,I5,F8.2)
      WRITE (10) REPNOW(I),NOWIJP(I)
    2 CONTINUE
      RETURN
      END
```

LIC REFERENCE MAP (R=1)

SN	TYPE		RELOCATION					
	REAL		AZ	102	AZOUT	REAL		
T	REAL	ARRAY	INTER	10	C	REAL		CCNST
	REAL		CONST	0	FT2NM	REAL		CCNST
E	REAL		CONST	103	I	INTEGER		
	INTEGER	ARRAY	INTER	1511	INTRVL	INTEGER	ARRAY	INTER
	INTEGER			3723	ISAVE	INTEGER		REPLY
	INTEGER	ARRAY	SORT	13560	ISORTX	INTEGER	ARRAY	SCRT
	INTEGER	ARRAY	INTER	105	JOUT	INTEGER		
N	INTEGER	*UNDEF		1617	LINT	INTEGER	ARRAY	INTER
	INTEGER			47	MASK20	INTEGER		
	INTEGER			3721	NEXREP	INTEGER		REPLY
	INTEGER		INTER	1750	NOWIJP	INTEGER	ARRAY	REPLY
P	INTEGER		REPLY	11	ONEOVC	REAL		CCNST
	REAL		CONST	106	POW	REAL		
	REAL	ARRAY	INTER	1	REARTH	REAL		CCNST
	REAL	ARRAY	REPLY	3722	REPTIM	REAL		REPLY
	REAL	ARRAY	INTER	107	RHO1IY	REAL	ARRAY	INTER
	REAL	ARRAY	INTER	7	RTD	REAL		CCNST
	REAL	ARRAY	SORT	7640	SORTNX	REAL	ARRAY	SCRT
	REAL		CONST	2	TWO43E	REAL		CCNST

I	ID	LAT			LONG			SCAN	AZ(0)	BANG(0)			PULSE	RE
1	73	33	49	10	118	8	15	13.0	342.2	.001450	415.	0.	0.	
2	76	33	55	57	118	24	23	13.0	107.1	.001966	536.	522.	316.	54
3	92	34	5	45	117	14	12	15.0	2.3	.001134	275.	0.	0.	
4	45	34	12	15	118	21	41	15.0	110.0	.000689	375.	0.	0.	
5	58	33	39	46	117	42	43	13.0	137.8	.001723	390.	0.	0.	
6	79	33	53	4	117	15	34	15.0	299.5	.000332	220.	0.	0.	
7	95	34	3	15	117	35	41	13.0	35.5	.001457	300.	0.	0.	
8	110	33	44	45	118	20	7	6.0	223.4	.000691	370.	0.	0.	
9	111	33	42	0	117	50	0	6.0	356.5	.000209	275.	0.	0.	
10	21	32	48	0	112	55	0	15.0	249.8	.002448	275.	0.	0.	
11	27	33	3	38	113	9	29	5.0	76.4	.002336	358.	0.	0.	
12	33	32	39	0	114	35	0	6.0	310.5	.000327	400.	0.	0.	
13	34	32	39	0	114	35	0	6.0	194.7	.002047	268.	0.	0.	
14	43	37	10	0	121	54	0	5.0	113.1	.000047	278.	0.	0.	
15	46	35	31	0	121	4	0	5.0	338.9	.001913	241.	0.	0.	
16	47	37	22	37	120	33	3	15.0	210.6	.000723	410.	0.	0.	
17	48	37	22	34	120	33	3	15.0	319.2	.002258	300.	0.	0.	
18	49	37	27	0	120	34	0	6.0	142.7	.001242	250.	0.	0.	
19	50	35	40	0	117	38	0	15.0	335.2	.002180	395.	0.	0.	
20	51	35	40	0	117	40	0	10.0	75.5	.001489	450.	0.	0.	
21	52	35	40	0	117	40	0	15.0	167.1	.002220	305.	0.	0.	
22	53	37	43	0	121	54	0	6.0	160.8	.001570	220.	0.	0.	
23	54	33	18	0	117	22	0	6.0	84.6	.001145	267.	0.	0.	
24	55	33	17	0	117	23	0	6.0	212.8	.001909	300.	0.	0.	
25	56	33	18	45	117	24	0	6.0	178.2	.001110	267.	0.	0.	
26	57	34	52	22	117	54	38	12.0	75.6	.002305	380.	0.	0.	
27	59	34	8	8	117	27	28	15.0	55.0	.002080	250.	0.	0.	
28	61	36	46	51	119	43	6	13.0	244.0	.002116	420.	0.	0.	
29	62	34	36	14	117	22	12	15.0	130.2	.002315	267.	0.	0.	
30	63	34	35	0	117	23	0	15.0	101.2	.000632	275.	0.	0.	
31	67	37	40	30	122	7	30	20.0	33.7	.000946	300.	0.	0.	
32	69	37	40	0	122	7	0	20.0	239.8	.000782	300.	0.	0.	
33	70	32	33	52	117	6	43	20.0	183.7	.001626	250.	0.	0.	
34	72	36	20	44	119	54	18	12.0	139.1	.000459	300.	0.	0.	
35	74	33	47	0	118	3	0	20.0	306.6	.000290	300.	0.	0.	
36	75	33	47	0	118	3	0	20.0	260.0	.001775	200.	0.	0.	
37	77	33	57	12	118	24	0	13.0	5.7	.001603	405.	0.	0.	
38	78	35	59	32	118	26	42	6.0	343.4	.000179	278.	0.	0.	
39	85	32	53	11	117	8	45	13.0	139.5	.001057	350.	0.	0.	
40	86	36	35	16	121	50	9	15.0	322.9	.001511	395.	0.	0.	
41	87	36	35	52	121	52	25	15.0	207.4	.000191	300.	0.	0.	
42	88	32	52	33	116	24	51	5.0	206.0	.002270	241.	0.	0.	
43	89	37	25	28	122	0	50	15.0	282.4	.000304	375.	0.	0.	
44	90	34	11	18	118	55	53	6.0	100.4	.001473	296.	0.	0.	
45	91	32	41	0	117	12	0	6.0	84.0	.001132	300.	0.	0.	
46	96	34	36	50	118	6	25	15.0	289.6	.001560	270.	0.	0.	
47	97	35	23	44	120	21	12	5.0	185.9	.000343	365.	0.	0.	
48	98	34	3	16	117	47	18	10.0	266.5	.001584	296.	0.	0.	
49	100	34	7	0	119	7	0	15.0	182.6	.001755	436.	350.	447.	54
50	101	34	6	47	119	7	13	15.0	202.3	.001871	322.	0.	0.	
51	105	32	50	0	118	30	0	16.0	174.8	.000770	300.	0.	0.	
52	106	32	42	0	117	14	0	15.0	288.2	.002190	300.	0.	0.	
53	107	32	42	0	117	14	0	10.0	323.1	.000107	245.	0.	0.	
54	108	32	42	0	117	14	0	10.0	307.5	.002136	240.	0.	0.	
55	109	33	15	0	119	30	0	15.0	180.5	.001722	360.	0.	0.	
56	112	33	42	0	117	50	0	6.0	66.4	.000503	290.	0.	0.	
57	116	34	14	0	116	3	0	6.0	308.9	.000745	295.	0.	0.	
58	117	34	14	0	116	3	0	15.0	78.8	.000304	218.	0.	0.	
59	120	34	35	14	120	35	37	6.0	343.3	.002032	360.	0.	0.	
60	121	34	43	42	120	34	31	15.0	207.7	.001339	275.	0.	0.	
61	123	34	12	56	118	28	27	15.0	130.4	.001825	280.	0.	0.	
62	124	34	12	5[illegible]	118	28	15	10.0	182.2	.001610	218.	0.	0.	

	PULSE REPETITION RATE							RHO1IX	RHO1IY	RANGE
5.	0.	0.	0.	0.	0.	0.	0.	13.4	-6.8	15.0
6.	522.	316.	548.	525.	432.	346.	443.	0.0	0.0	0.0
5.	0.	0.	0.	0.	0.	0.	0.	58.1	10.1	59.0
5.	0.	0.	0.	0.	0.	0.	0.	2.2	16.3	16.5
0.	0.	0.	0.	0.	0.	0.	0.	34.7	-16.1	38.2
0.	0.	0.	0.	0.	0.	0.	0.	57.1	-2.6	57.2
0.	0.	0.	0.	0.	0.	0.	0.	40.3	7.5	41.0
0.	0.	0.	0.	0.	0.	0.	0.	3.5	-11.2	11.7
5.	0.	0.	0.	0.	0.	0.	0.	28.6	-13.9	31.8
5.	0.	0.	0.	0.	0.	0.	0.	276.4	-60.5	283.0
8.	0.	0.	0.	0.	0.	0.	0.	263.5	-45.6	267.5
1.	0.	0.	0.	0.	0.	0.	0.	193.0	-73.3	206.5
6.	0.	0.	0.	0.	0.	0.	0.	193.0	-73.3	206.5
8.	0.	0.	0.	0.	0.	0.	0.	-166.9	196.8	258.1
41.	0.	0.	0.	0.	0.	0.	0.	-129.9	96.7	161.9
0.	0.	0.	0.	0.	0.	0.	0.	-102.2	207.6	231.4
00.	0.	0.	0.	0.	0.	0.	0.	-102.2	207.6	231.4
50.	0.	0.	0.	0.	0.	0.	0.	-102.9	212.0	235.6
95.	0.	0.	0.	0.	0.	0.	0.	37.7	104.2	110.8
50.	0.	0.	0.	0.	0.	0.	0.	36.1	104.2	110.2
05.	0.	0.	0.	0.	0.	0.	0.	36.1	104.2	110.2
20.	0.	0.	0.	0.	0.	0.	0.	-165.7	229.7	283.2
67.	0.	0.	0.	0.	0.	0.	0.	52.1	-37.7	64.3
00.	0.	0.	0.	0.	0.	0.	0.	51.3	-38.7	64.3
67.	0.	0.	0.	0.	0.	0.	0.	50.5	-37.0	62.5
80.	0.	0.	0.	0.	0.	0.	0.	24.4	56.5	61.5
50.	0.	0.	0.	0.	0.	0.	0.	47.1	12.4	48.7
20.	0.	0.	0.	0.	0.	0.	0.	-63.0	171.2	182.5
67.	0.	0.	0.	0.	0.	0.	0.	51.2	40.5	65.3
75.	0.	0.	0.	0.	0.	0.	0.	50.5	39.3	64.0
00.	0.	0.	0.	0.	0.	0.	0.	-176.5	227.6	288.0
00.	0.	0.	0.	0.	0.	0.	0.	-176.1	227.1	287.4
50.	0.	0.	0.	0.	0.	0.	0.	65.5	-81.7	104.7
00.	0.	0.	0.	0.	0.	0.	0.	-72.4	145.3	162.3
00.	0.	0.	0.	0.	0.	0.	0.	17.8	-8.9	19.9
00.	0.	0.	0.	0.	0.	0.	0.	17.8	-8.9	19.9
05.	0.	0.	0.	0.	0.	0.	0.	.3	1.3	1.3
76.	0.	0.	0.	0.	0.	0.	0.	-1.9	123.6	123.6
50.	0.	0.	0.	0.	0.	0.	0.	63.5	-62.4	89.0
95.	0.	0.	0.	0.	0.	0.	0.	-165.1	162.0	231.3
00.	0.	0.	0.	0.	0.	0.	0.	-166.9	162.7	233.1
41.	0.	0.	0.	0.	0.	0.	0.	100.4	-62.4	118.2
75.	0.	0.	0.	0.	0.	0.	0.	-171.8	212.4	273.2
96.	0.	0.	0.	0.	0.	0.	0.	-26.1	15.4	30.3
90.	0.	0.	0.	0.	0.	0.	0.	60.9	-74.6	96.3
70.	0.	0.	0.	0.	0.	0.	0.	14.8	40.9	43.5
65.	0.	0.	0.	0.	0.	0.	0.	-95.2	88.7	130.1
96.	0.	0.	0.	0.	0.	0.	0.	30.7	7.4	31.6
36.	350.	447.	542.	525.	320.	554.	530.	-35.3	11.2	37.0
322.	0.	0.	0.	0.	0.	0.	0.	-35.5	11.0	37.1
300.	0.	0.	0.	0.	0.	0.	0.	-4.7	-65.9	66.1
300.	0.	0.	0.	0.	0.	0.	0.	59.2	-73.6	94.5
245.	0.	0.	0.	0.	0.	0.	0.	59.2	-73.6	94.5
240.	0.	0.	0.	0.	0.	0.	0.	59.2	-73.6	94.5
360.	0.	0.	0.	0.	0.	0.	0.	-54.9	-40.7	68.3
290.	0.	0.	0.	0.	0.	0.	0.	28.6	-13.9	31.8
295.	0.	0.	0.	0.	0.	0.	0.	116.9	19.4	118.5
218.	0.	0.	0.	0.	0.	0.	0.	116.9	19.4	118.5
360.	0.	0.	0.	0.	0.	0.	0.	-108.0	40.4	115.3
275.	0.	0.	0.	0.	0.	0.	0.	-106.9	48.9	117.6

```
62   124    34 12 50   118 28 15    10.0        182.2       .001610  218.   0.    0.   (
63   421    36 19  8   115 34 27     5.0        138.4       .002218  360.   0.    0.   (
64   425    37  8  0   114  6  0    15.0        317.1       .001911  287.   0.    0.   (
65   430    36 34  0   115 38  0    15.0         26.9       .000323  287.   0.    0.   (
66   431    36  5  5   115  9 32    15.0        330.0       .001912  400.   0.    0.   (
67   433    36 35 12   115 20 15     6.0        182.5       .001912  300.   0.    0.   (
68   435    36 15  0   115  2  0    15.0        342.9       .001304  275.   0.    0.   (
69   438    37 46  0   116 38  0    15.0        330.5       .002393  287.   0.    0.   (
70   439    38  8 30   117 11 58     5.0        115.8       .001878  241.   0.    0.   (

***** WARNING - INTERROGATOR LIMIT OF 70 HAS BEEN REACHED.


    5 REPLIES, AZ = 129.6    73  1.8875000  1.8900000  1.8881973  WIN    1.8883
 1.888334****  500   -65.20
 1.888339****   22   -65.16
 1.888376****  190   -64.68
 1.888401****  296   -65.08
 1.888403****  145   -65.05

    6 REPLIES, AZ = 129.6    73  1.8900000  1.8925000  1.8906169  WIN    1.8907
 1.890737****  623   -65.54
 1.890743****  500   -65.20
 1.890749****   22   -65.16
 1.890785****  190   -64.68
 1.890811****  296   -65.08
 1.890812****  145   -65.05

    6 REPLIES, AZ = 129.8    73  1.8925000  1.8950000  1.8930165  WIN    1.8931
 1.893147****  623   -65.54
 1.893153****  500   -65.20
 1.893158****   22   -65.16
 1.893195****  190   -64.68
 1.893220****  296   -65.08
 1.893222****  145   -65.05

    6 REPLIES, AZ = 130.0    73  1.8950000  1.8975000  1.8954262  WIN    1.8955
 1.895556****  623   -65.54
 1.895563****  500   -65.20
 1.895568****   22   -65.16
 1.895604****  190   -64.68
 1.895630****  296   -65.08
 1.895632****  145   -65.05

    5 REPLIES, AZ = 130.2    73  1.8975000  1.9000000  1.8978358  WIN    1.8979
 1.897966****  623   -65.54
 1.897972****  500   -65.20
 1.898014****  190   -64.68
 1.898040****  296   -65.08
 1.898041****  145   -65.05

    5 REPLIES, AZ = 130.4    73  1.9000000  1.9025000  1.9002455  WIN    1.9003
 1.900376****  623   -65.54
 1.900382****  500   -65.20
 1.900424****  190   -64.68
 1.900449****  296   -65.08
 1.900451****  145   -65.05

    5 REPLIES, AZ = 130.6    73  1.9025000  1.9050000  1.9026551  WIN    1.902
 1.902785****  623   -65.54
 1.902792****  500   -65.20
 1.902833****  190   -64.68
 1.902859****  296   -65.08
```

280.	0.	0.	0.	0.	0.	0.	0.	[illegible]	17.0	17.3
218.	0.	0.	0.	0.	0.	0.	0.	-3.2	16.9	17.2
360.	0.	0.	0.	0.	0.	0.	0.	136.9	145.0	199.4
287.	0.	0.	0.	0.	0.	0.	0.	205.8	196.3	284.4
287.	0.	0.	0.	0.	0.	0.	0.	133.6	159.8	208.3
400.	0.	0.	0.	0.	0.	0.	0.	157.4	131.6	205.1
300.	0.	0.	0.	0.	0.	0.	0.	147.8	161.4	218.8
275.	0.	0.	0.	0.	0.	0.	0.	163.1	141.7	216.1
287.	0.	0.	0.	0.	0.	0.	0.	84.1	230.6	245.5
241.	0.	0.	0.	0.	0.	0.	0.	57.0	252.7	259.0

4973	WIN	1.888315	1.888562	1.890725	1.890972	1.893134	1.893381
1069	WIN	1.890725	1.890972	1.893134	1.893381	1.895544	1.895791
1165	WIN	1.893134	1.893381	1.895544	1.895791	1.897953	1.898201
9262	WIN	1.895544	1.895791	1.897953	1.898201	1.900363	1.900610
8758	WIN	1.897953	1.898201	1.900363	1.900610	1.902773	1.903020
2455	WIN	1.900363	1.900610	1.902773	1.903020	1.905182	1.905429
6551	WIN	1.902773	1.903020	1.905182	1.905429	1.907592	1.907839

INTERROGATOR NO. 58. BCAS ON 18[illegible].-DEGREE LAX RADIAL AT A RANGE OF 2[illegible]. NM.
GARBLE SUMMARY THIS POSITION - MIN = 0.0 MAX = 25.0 AVERAG

INTERROGATOR NO. 58. BCAS ON 18[illegible].-DEGREE LAX RADIAL AT A RANGE OF 30. NM.
GARBLE SUMMARY THIS POSITION - MIN = 0.0 MAX = 18.0 AVERAG

INTERROGATOR NO. 58. BCAS ON 180.-DEGREE LAX RADIAL AT A RANGE OF 40. NM.
GARBLE SUMMARY THIS POSITION - MIN = 0.0 MAX = 10.0 AVERAG

INTERROGATOR NO. 58. BCAS ON 180.-DEGREE LAX RADIAL AT A RANGE OF 50. NM.
GARBLE SUMMARY THIS POSITION - MIN = 0.0 MAX = 7.0 AVERAG

INTERROGATOR NO. 58. BCAS ON 18[illegible].-DEGREE LAX RADIAL AT A RANGE OF 60. NM.
GARBLE SUMMARY THIS POSITION - MIN = 0.0 MAX = 2.0 AVERAG

INTERROGATOR NO. 58. BCAS ON 27[illegible].-DEGREE LAX RADIAL AT A RANGE OF 10. NM.
GARBLE SUMMARY THIS POSITION - MIN = 0.0 MAX = 25.0 AVERAG

INTERROGATOR NO. 58. BCAS ON 270.-DEGREE LAX RADIAL AT A RANGE OF 20. NM.
GARBLE SUMMARY THIS POSITION - MIN = 0.0 MAX = 26.0 AVERAG

INTERROGATOR NO. 58. BCAS ON 270.-DEGREE LAX RADIAL AT A RANGE OF 30. NM.
GARBLE SUMMARY THIS POSITION - MIN = 0.0 MAX = 28.0 AVERAG

INTERROGATOR NO. 58. BCAS ON 27[illegible].-DEGREE LAX RADIAL AT A RANGE OF 4[illegible]. NM.
GARBLE SUMMARY THIS POSITION - MIN = 0.0 MAX = 32.0 AVERAG

INTERROGATOR NO. 58. BCAS ON 27[illegible].-DEGREE LAX RADIAL AT A RANGE OF 50. NM.
GARBLE SUMMARY THIS POSITION - MIN = 0.0 MAX = 35.0 AVERAG

INTERROGATOR NO. 58. BCAS ON 270.-DEGREE LAX RADIAL AT A RANGE OF 60. NM.
GARBLE SUMMARY THIS POSITION - MIN = 0.0 MAX = 35.0 AVERAG

PEX.SQ	2.603	14	SL-SYSIO	01/12/78	COMPASS	3. 3-433
PUT.PT/	21617	11				
LEQ.RM	2.631	42	SL-SYSIO	01/12/78	COMPASS	3. 3-433
LSF.SQ	20672	134	SL-SYSIO	01/12/78	COMPASS	3. 3-433
CLSV.FO/	21026	7				
LSV.SQ	21035	137	SL-SYSIO	01/12/78	COMPASS	3. 3-433
REW.FO/	21174	7				
EW.SQ	21203	33	SL-SYSIO	01/12/78	COMPASS	3. 3-433
GET.FO/	21236	7				
RPAR.XX/	21245	1				
GET.RT/	21246	11				
ET.SQ	21257	1060	SL-SYSIO	01/12/78	COMPASS	3. 3-433
.SQ	22337	101	SL-SYSIO	01/12/78	COMPASS	3. 3-433
.SQ	22440	50	SL-SYSIO	01/12/78	COMPASS	3. 3-433
EU.SQ	22510	106	SL-SYSIO	01/12/78	COMPASS	3. 3-433

.32 CP SECONDS 352[illegible]B CM STORAGE USED 33 TABL

OR NO. 58. BCAS ON 0.-DEGREE LAX RADIAL AT A RANGE OF 10. NM.
MARY THIS POSITION - MIN = 0.0 MAX = 24.0 AVERAGE = 9.2

OR NO. 58. BCAS ON 0.-DEGREE LAX RADIAL AT A RANGE OF 20. NM.
MARY THIS POSITION - MIN = 0.0 MAX = 25.0 AVERAGE = 9.8

OR NO. 58. BCAS ON 0.-DEGREE LAX RADIAL AT A RANGE OF 30. NM.
MARY THIS POSITION - MIN = 0.0 MAX = 24.0 AVERAGE = 1[illegible].7

OR NO. 58. BCAS ON 0.-DEGREE LAX RADIAL AT A RANGE OF 40. NM.
MARY THIS POSITION - MIN = 0.0 MAX = 26.0 AVERAGE = 10.6

OR NO. 58. BCAS ON 0.-DEGREE LAX RADIAL AT A RANGE OF 50. NM.
MARY THIS POSITION - MIN = 0.0 MAX = 27.0 AVERAGE = 11.6

OR NO. 58. BCAS ON 0.-DEGREE LAX RADIAL AT A RANGE OF 60. NM.
MARY THIS POSITION - MIN = 0.0 MAX = 25.0 AVERAGE = 11.8

OR NO. 58. BCAS ON 90.-DEGREE LAX RADIAL AT A RANGE OF 10. NM.
MARY THIS POSITION - MIN = 0.0 MAX = 14.0 AVERAGE = 4.6

OR NO. 58. BCAS ON 90.-DEGREE LAX RADIAL AT A RANGE OF 20. NM.
MARY THIS POSITION - MIN = 0.0 MAX = 10.0 AVERAGE = 2.6

OR NO. 58. BCAS ON 90.-DEGREE LAX RADIAL AT A RANGE OF 30. NM.
MARY THIS POSITION - MIN = 0.0 MAX = 8.0 AVERAGE = 1.6

OR NO. 58. BCAS ON 90.-DEGREE LAX RADIAL AT A RANGE OF 4 . NM.
MARY THIS POSITION - MIN = 0.0 MAX = 9.0 AVERAGE = 1.5

OR NO. 58. BCAS ON 9 .-DEGREE LAX RADIAL AT A RANGE OF 50. NM.
MARY THIS POSITION - MIN = 0.0 MAX = 11.0 AVERAGE = 1.6

OR NO. 58. BCAS ON 90.-DEGREE LAX RADIAL AT A RANGE OF 60. NM.
MMARY THIS POSITION - MIN = 0.0 MAX = 14.0 AVERAGE = 2.0

OR NO. 58. BCAS ON 180.-DEGREE LAX RADIAL AT A RANGE OF 10. NM.
MMARY THIS POSITION - MIN = 0.0 MAX = 25.0 AVERAGE = 8.[illegible]

APPENDIX B
BCAS MODE SELECTION

Over 100 modes of BCAS have been analyzed using the simulation tool described in Appendix E. Candidate modes of operation were selected based on the criteria of:

- Accuracy better than 825 feet
- ATCRBS/DABS/ATARS/ATC compatibility
- Ability to work everywhere and under all conditions

The initial selection of candidate modes was then configured as a preliminary system concept and is illustrated in Figure B-1. It should be noted that not all modes meet the required position accuracy of 825 feet but are the best available to satisfy the additional compatibility and operational criteria without adding special features to BCAS.

It should be further noted that options for additional features such as a directional antenna, synchro-DABS, azimuth echo and operation with unmodified ATCRBS sites appear in this figure.

The recommended concept, which uses a directional antenna and requires synchro-DABS with azimuth echo whenever the DABS all-call lockout bit is set, was formulated to eliminate modes with poor accuracy and to provide operational capability in high density airspace. Even in this case, a few modes exist, particularly in singular regions, where the accuracy requirement cannot be met. The penalty in these regions for reduced accuracy is a higher false alarm rate and missed alarm rate but represents a graceful degradation in system performance.

FOR

FIGURE B-1

BCAS MODE SELECTION AND CONTROL LOGIC

(DETAILED FLOW)

(SEE DRAWING)

APPENDIX C

TRAFFIC MODELS AND AIRCRAFT DENSITIES

A traffic model was required for the technical analysis of the various BCAS modes. The L.A. Basin was used for modelling purposes since it represents both the region of highest aircraft density, and the largest area of continuous high density. Therefore, the Basin represents the pacing terminal area for BCAS design. Several traffic forecast models for the L.A. Basin in 1982 and beyond were studied (References C-1 and C-2. A model (Reference C-1) based on an actual traffic "snapshot" in 1972 and projected into 1982 was used as the baseline for comparison

This "full 1982" model of 743 aircraft in a 120 by 120 nmi square area centered at the L.A. airport was then reduced by roughly half to 382 aircraft by randomly deselecting aircraft to produce a "half density" model. This was performed again to produce a quarter density model of 177 aircraft, so that interim measurements and analyses could be accomplished. Examples of the tr traffic distribution for each model are illustrated in Figures C-1, C-2, and C-3. The quarter density model

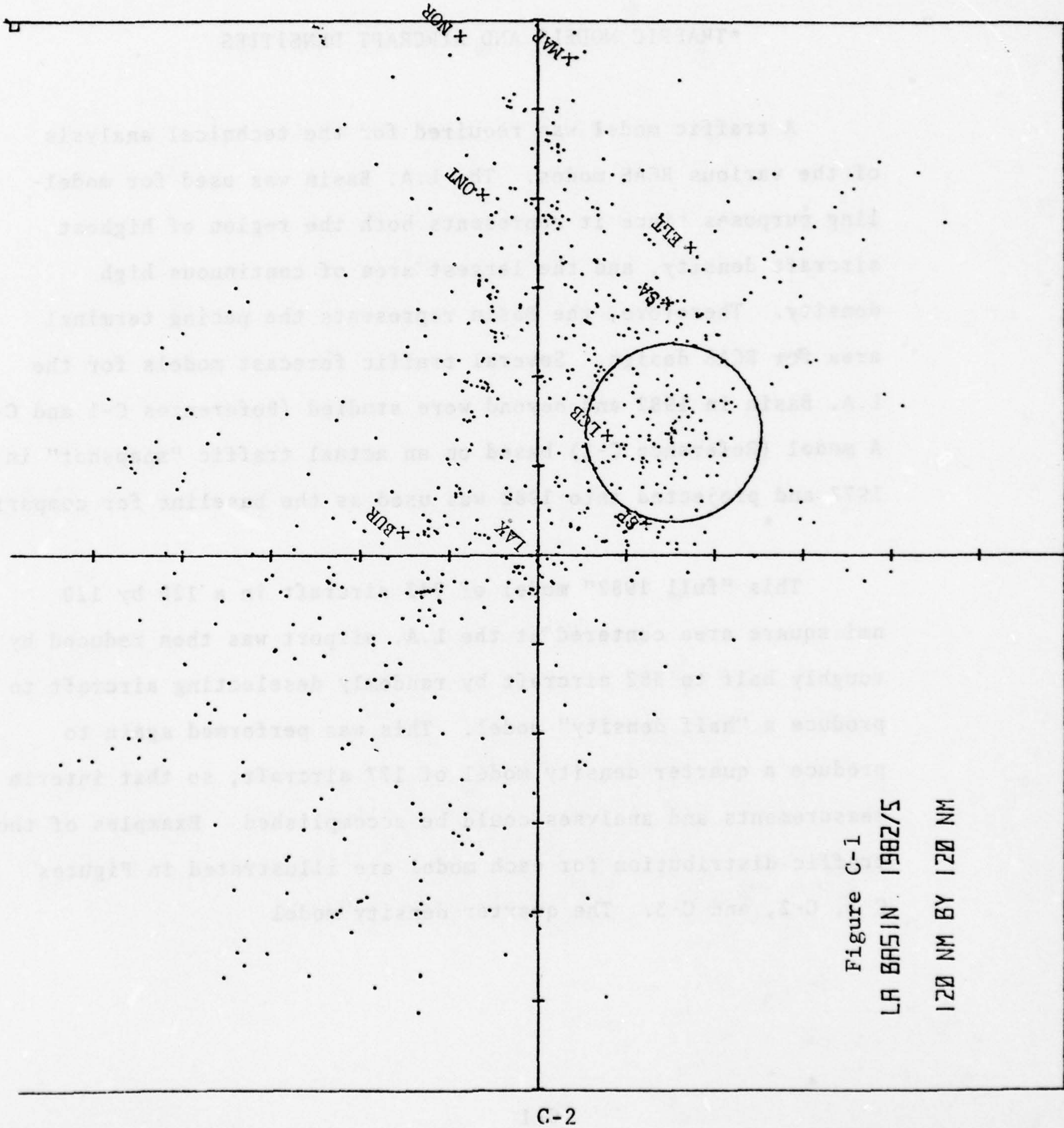


Figure C-1
LA BASIN 1982/5
120 NM BY 120 NM

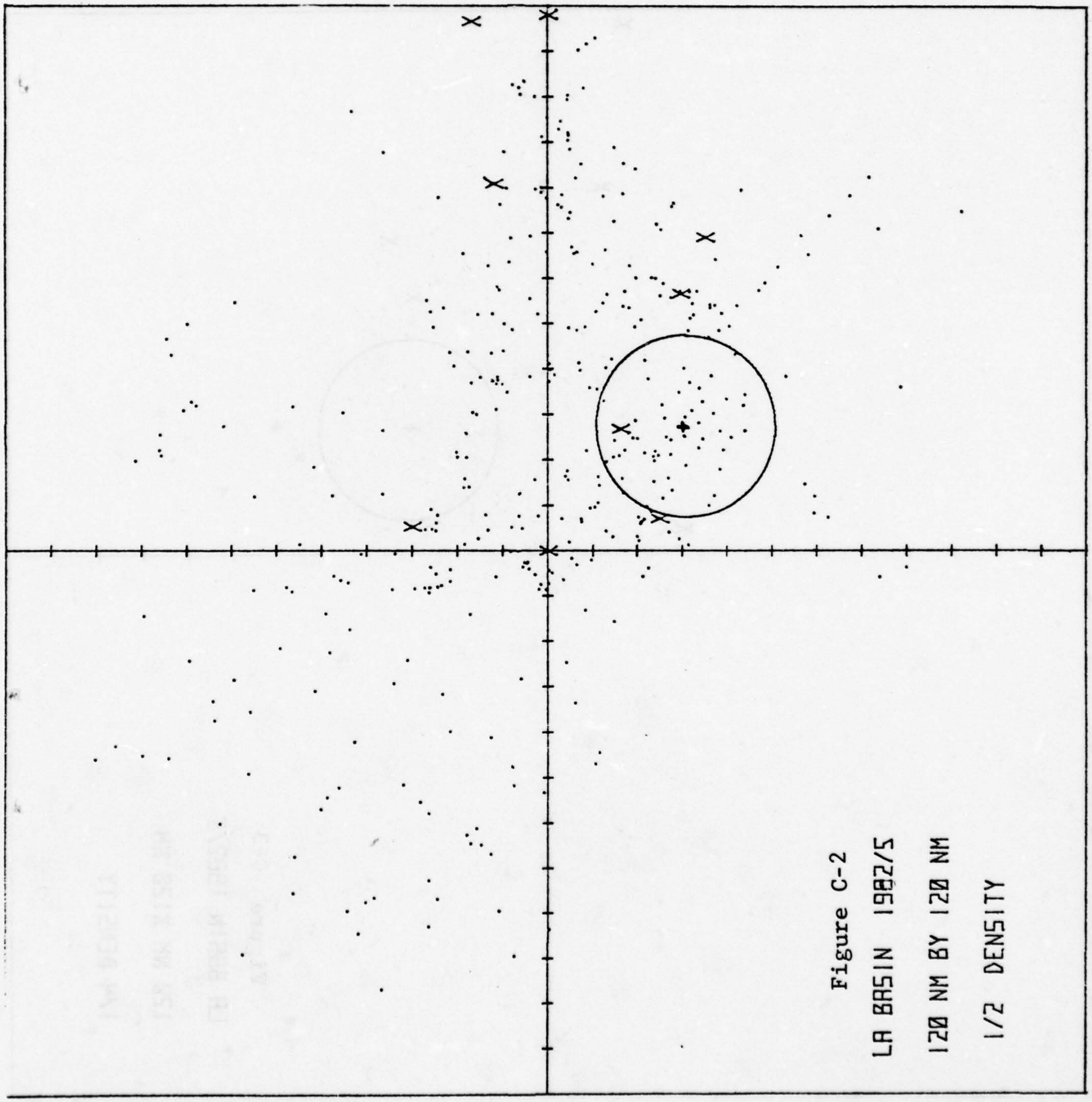


Figure C-2
LA BASIN 1982/5
120 NM BY 120 NM
1/2 DENSITY

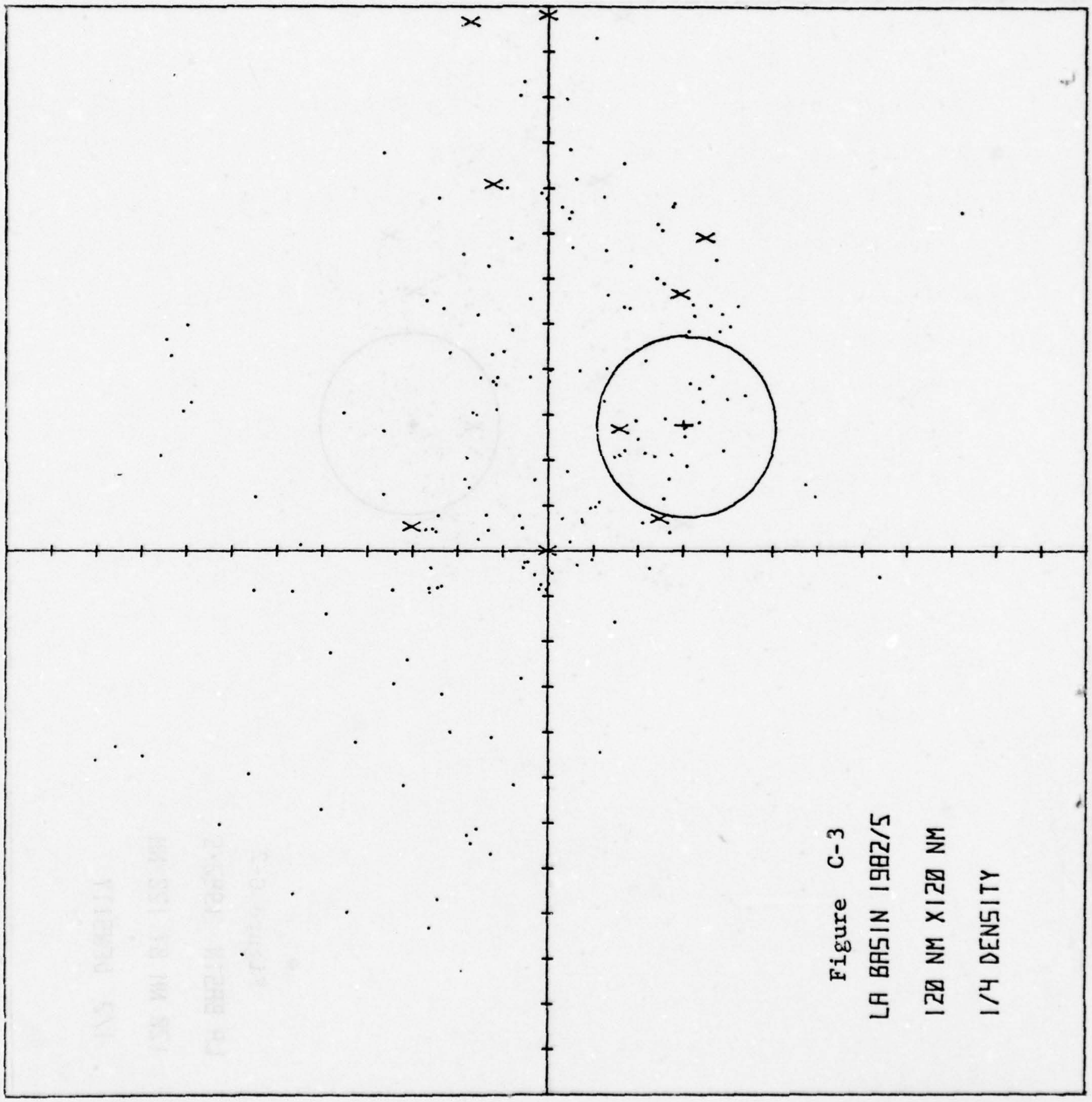


Figure C-3
LA BASIN 1982/5
120 NM X120 NM
1/4 DENSITY

of 177 aircraft is not significantly different from the 1975 beacon-only peak traffic count of 150 aircraft.

In order to simulate a realistic test environment, a "target" aircraft was chosen (#399) which was located in a relatively high density (but not the peak density) area of the basin (13 nmi East and 15 nmi South of LAX). A ten nautical mile radius circle was then drawn on each model representation of the basin to indicate where the BCAS aircraft simulation was to be tested. The 10 nmi range was used to simulate the tracking problems for a BCAS with a 10 nmi reception and tracking range. Figure C-4 shows the traffic density count taken by the BCAS in 10 degree increments as it is positioned around aircraft #399. The counts are given for the full, half, and quarter densities counting all the aircraft within 10 nmi of the BCAS aircraft. Obviously local peaks occur when the BCAS is at roughly 90° and 330° from #399, and a minimum at 190° (over San Pedro Bay).

In a separate density analysis, it was assumed that any aircraft in the basin could be a BCAS. Each of 743 aircraft were examined to determine the number of targets within 5, 10, 20 nmi with and without altitude filtering of ±3000 ft. The results of this analysis are presented in histogram form in Figures C-5 through C-10. Figure C-11 is a similar histogram but shows the number of aircraft around each of the 743 aircraft

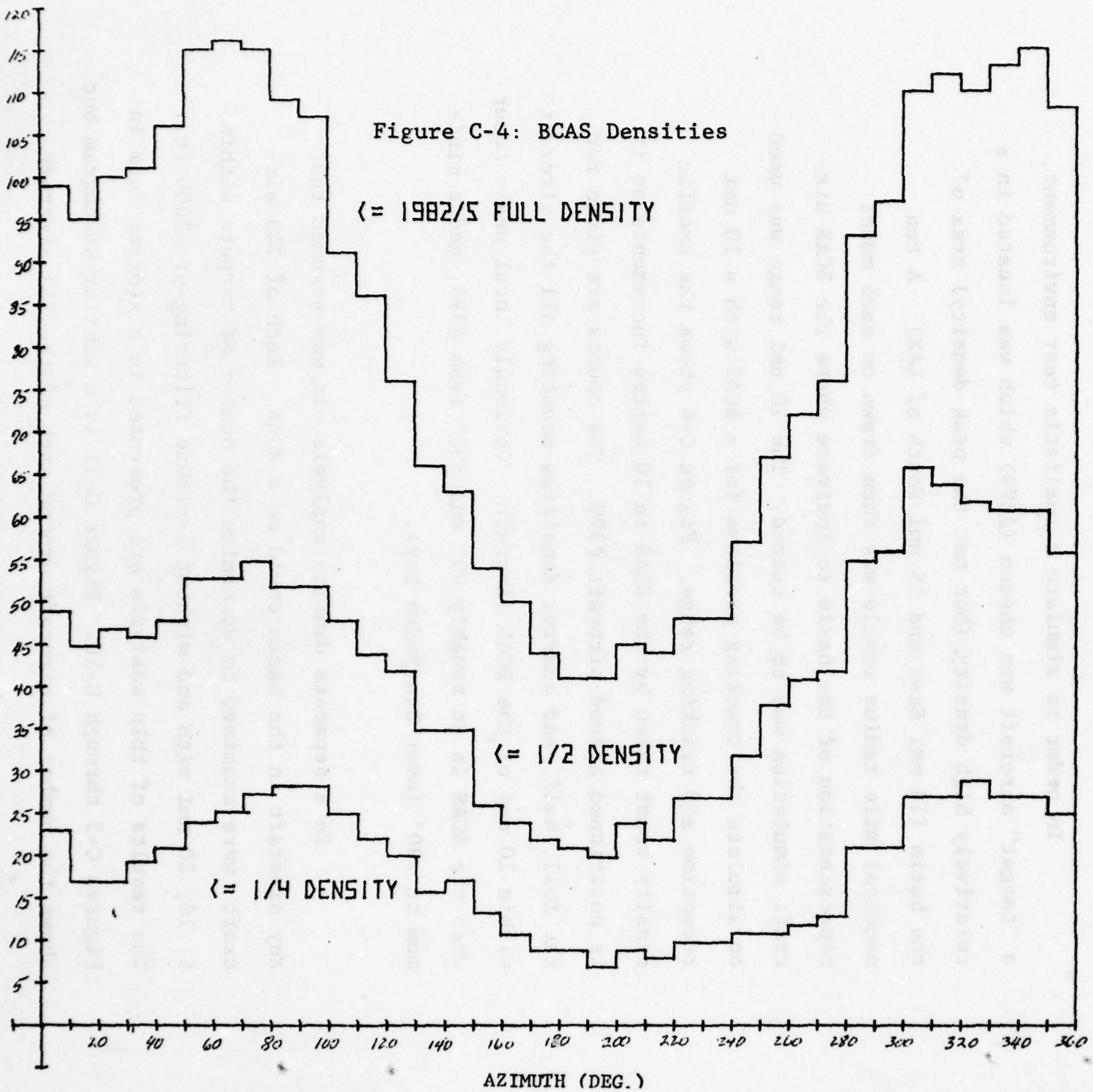
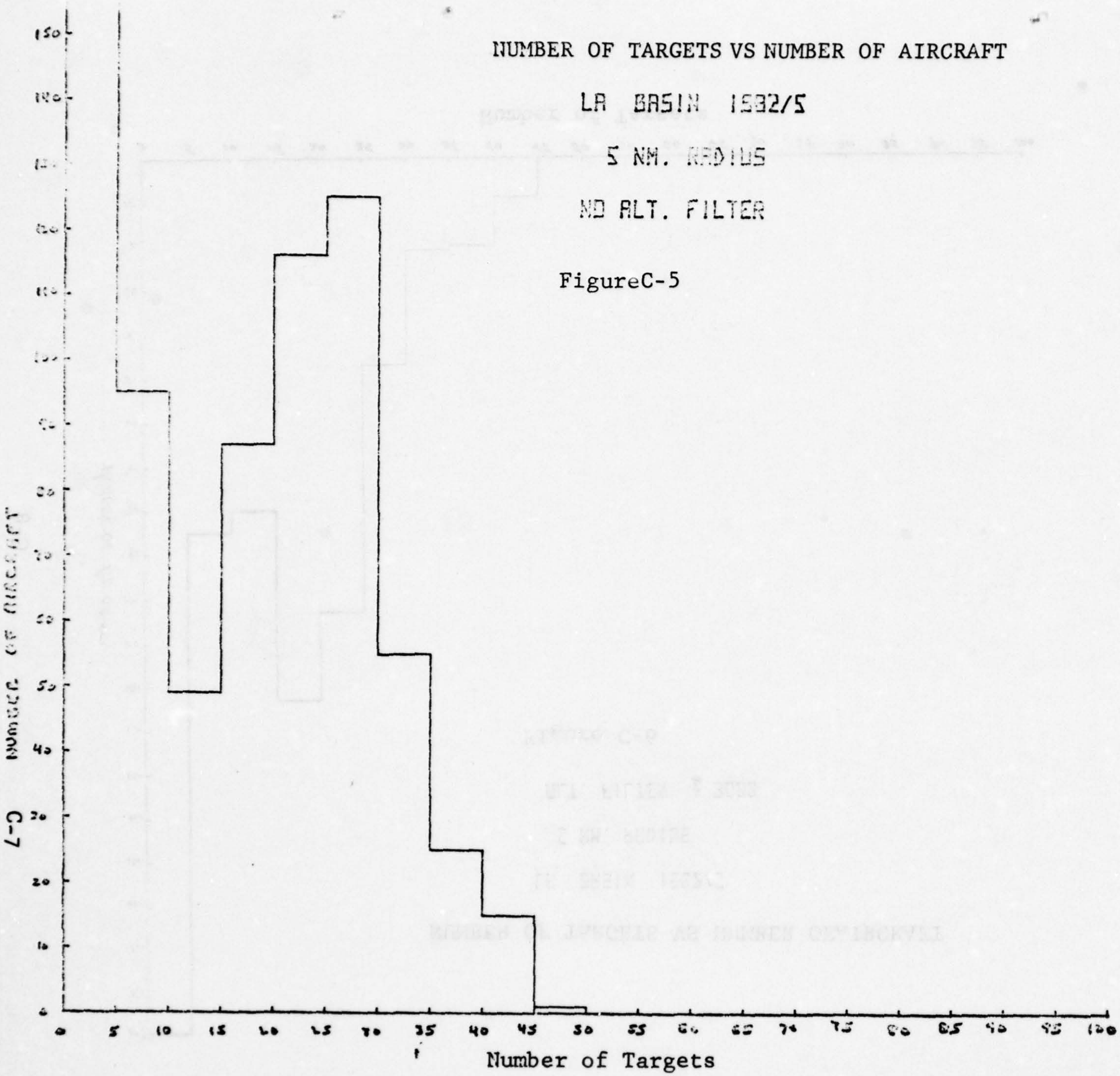


Figure C-4: BCAS Densities



NUMBER OF TARGETS VS NUMBER OF AIRCRAFT

LA BASIN 1982/5

5 NM. RADIUS

NO ALT. FILTER

FigureC-5

NUMBER OF TARGETS VS NUMBER OFAIRCRAFT

LA BASIN 1982/5

5 NM. RADIUS

ALT. FILTER ± 3000

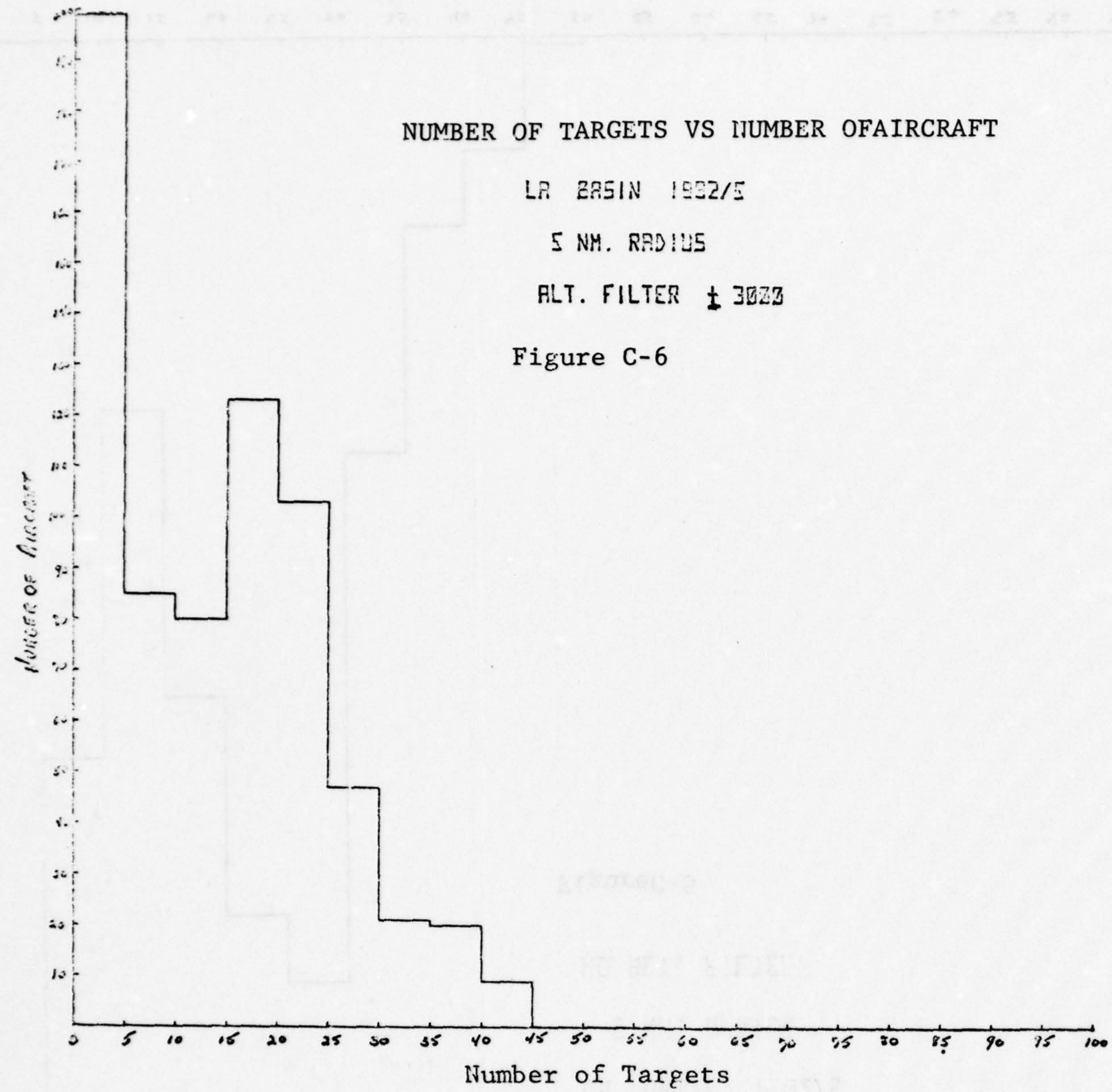
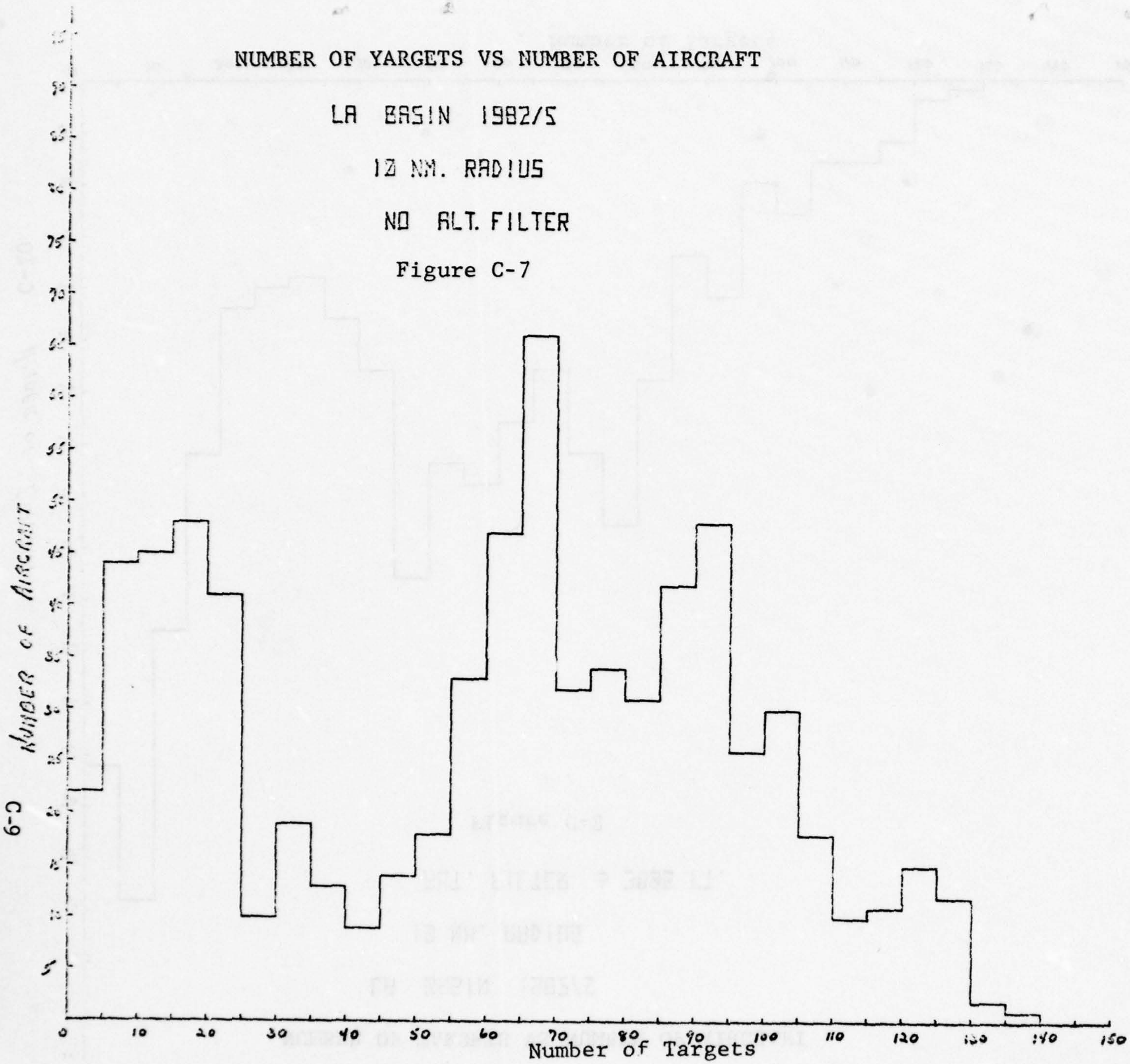


Figure C-6


NUMBER OF YARGETS VS NUMBER OF AIRCRAFT
LA BASIN 1982/5
10 NM. RADIUS
NO ALT. FILTER
Number of Aircraft
Number of Targets
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
5
10
15
20
25
30
35
40
45
50
55
60
65
70
75
80
85
90
95
Figure C-7

NUMBER OF TARGETS VS NUMBER OF AIRCRAFT

LA BASIN 1962/5

10 NM. RADIUS

ALT. FILTER ± 3000 FT.

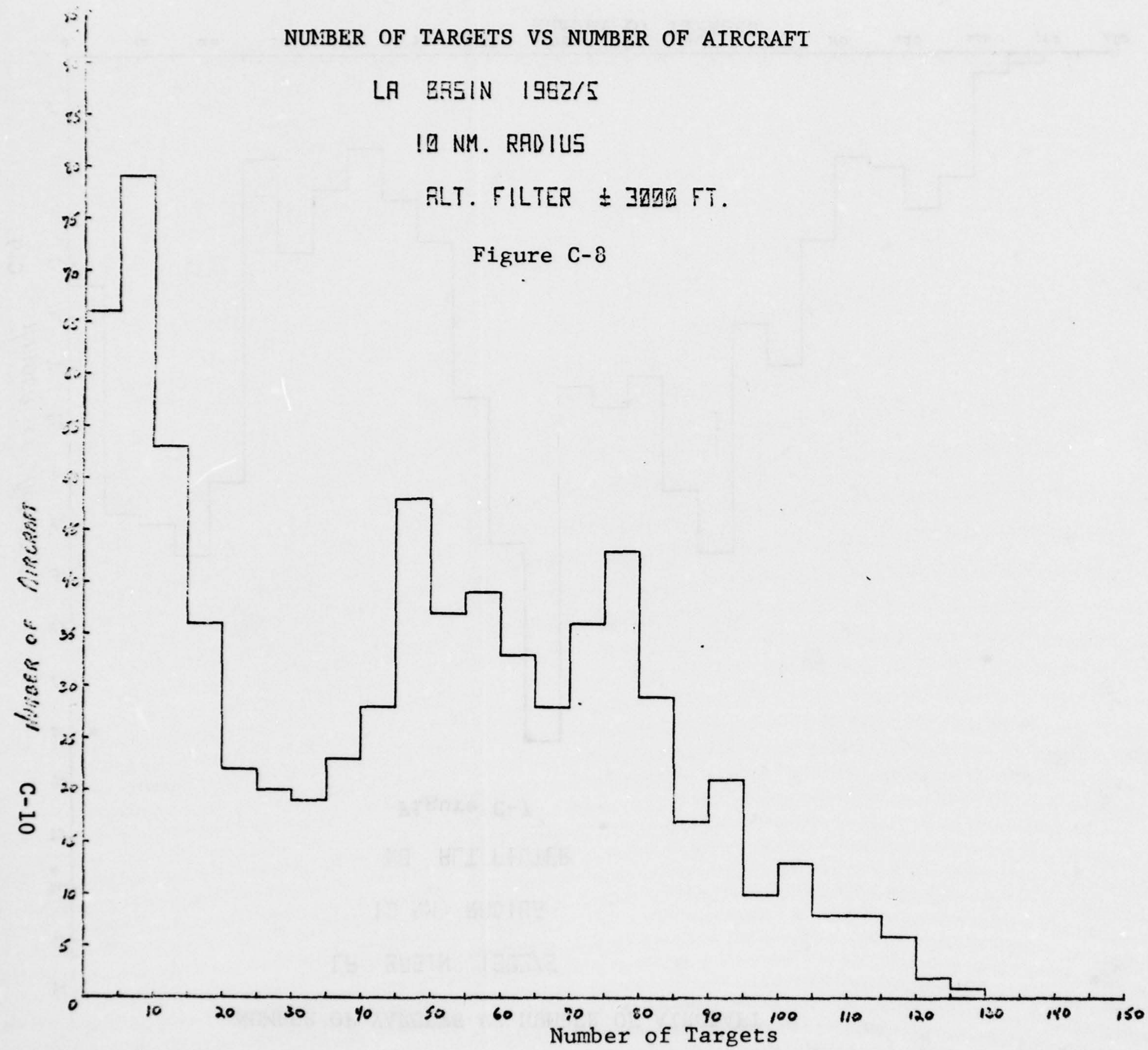


Figure C-8

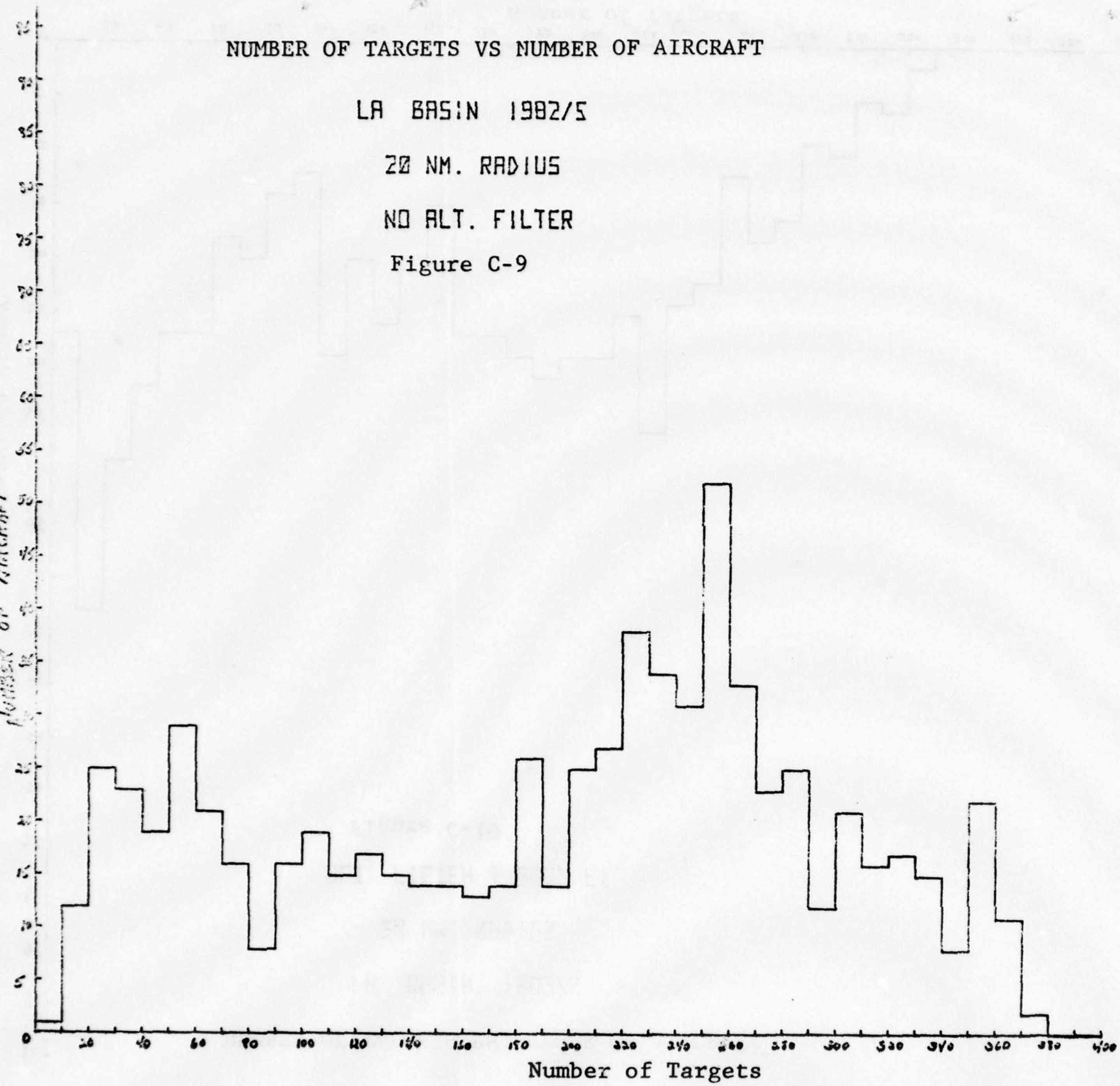
NUMBER OF TARGETS VS NUMBER OF AIRCRAFT

LA BASIN 1982/5

20 NM. RADIUS

NO ALT. FILTER

Figure C-9



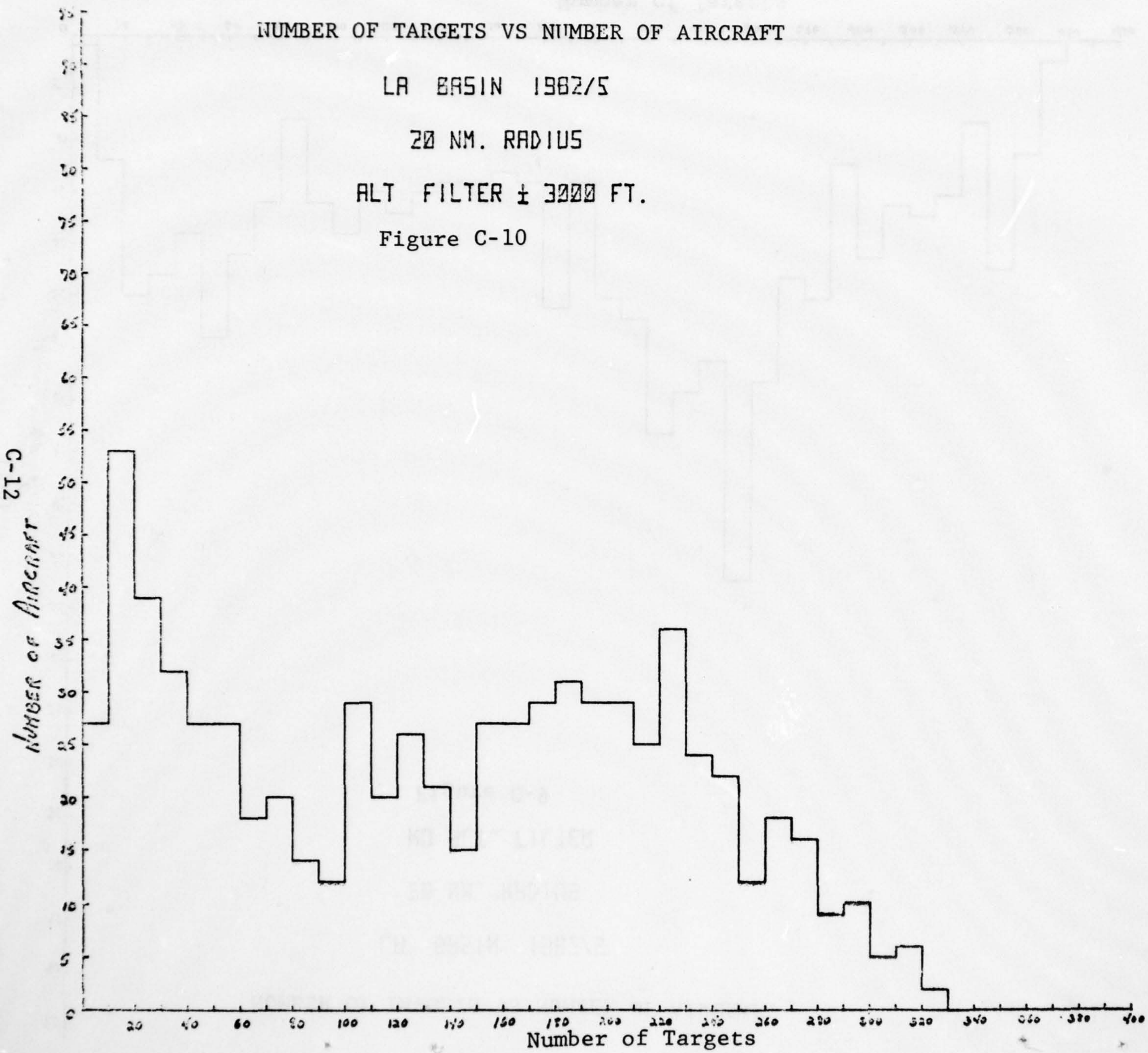
NUMBER OF TARGETS VS NUMBER OF AIRCRAFT

LA BASIN 1982/5

20 NM. RADIUS

ALT FILTER ± 3000 FT.

Figure C-10



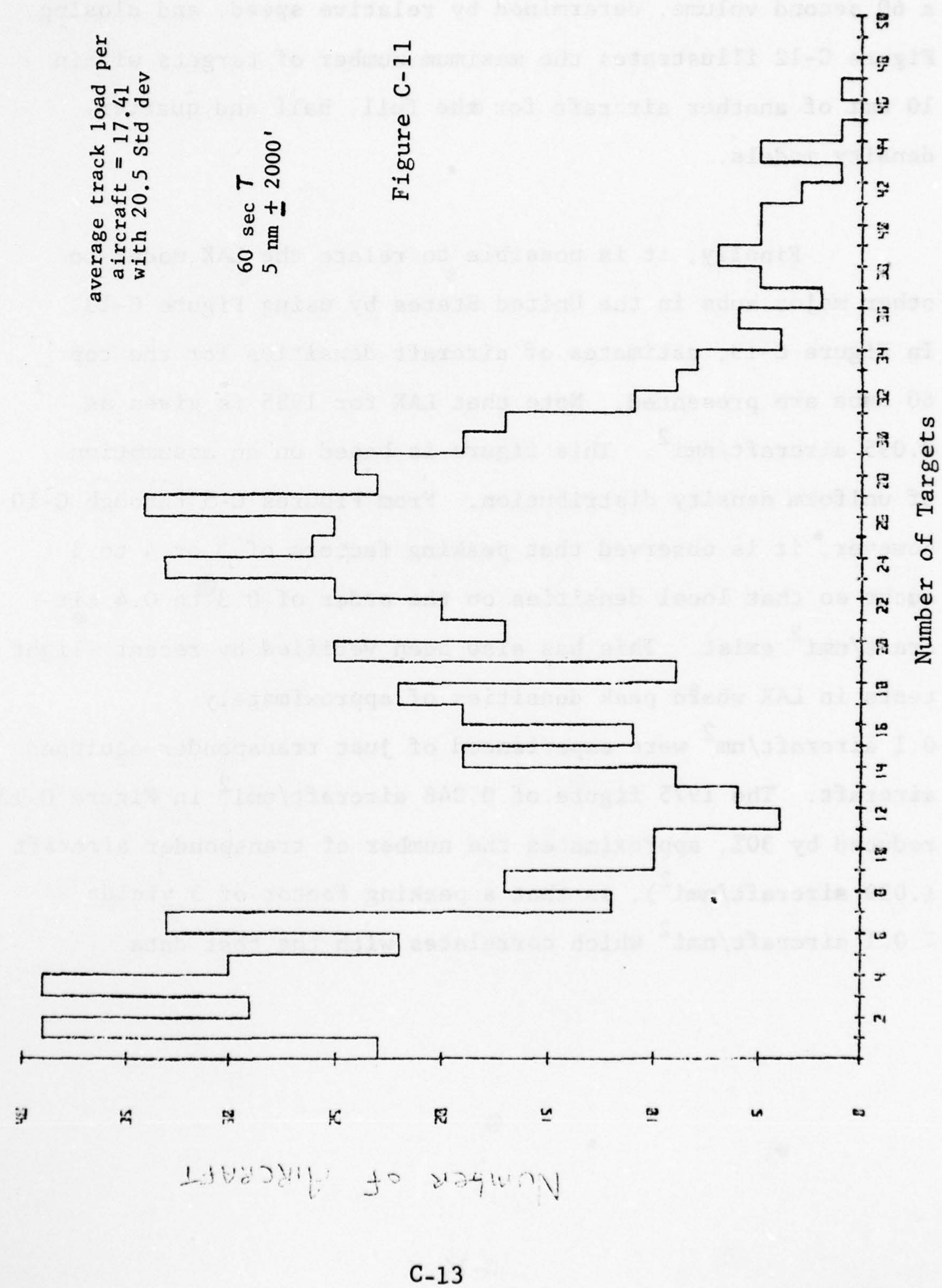

average track load per
aircraft = 17.41
with 20.5 Std dev
60 sec T
5 nm ± 2000'
Number of Targets
Number of Aircraft
0
5
10
15
20
25
30
35
40

Figure C-11

in the L.A. Basin within 5 nmi and ±2000 ft and all others within a 60 second volume, determined by relative speed, and closing. Figure C-12 illustrates the maximum number of targets within 10 nmi of another aircraft for the full, half and quarter density models.

Finally, it is possible to relate the LAX model to other major hubs in the United States by using Figure C-13. In Figure C-13, estimates of aircraft densities for the top 60 hubs are presented. Note that LAX for 1985 is given as 0.095 aircraft/nmi^2. This figure is based on an assumption of uniform density distribution. From Figures C-5 through C-10, however, it is observed that peaking factors of 3 or 4 to 1 occur so that local densities on the order of 0.3 to 0.4 aircraft/nmi^2 exist. This has also been verified by recent flight tests in LAX where peak densities of approximately 0.1 aircraft/nm^2 were experienced of just transponder-equipped aircraft. The 1975 figure of 0.048 aircraft/nmi^2 in Figure C-13, reduced by 30%, approximates the number of transponder aircraft (.039 aircraft/nmi^2), so that a peaking factor of 3 yields $\simeq$ 0.1 aircraft/nmi^2 which correlates with the test data.

	BASIN	BCAS	ABS. MAX
FULL	743	116	140
HALF	382	66	80
QUARTER	177	29	35

Figure C-12: NUMBER OF AIRCRAFT WITHIN 1- nmi RADIUS OFBCAS

HUB	1975	1980	1985	1990	1995
LAX	0.048	0.068	0.095	0.133	0.128
CHI	0.028	0.040	0.056	0.079	0.110
MIA	0.025	0.038	0.050	0.070	0.098
SFO	0.022	0.031	0.043	0.061	0.085
NYC	0.020	0.029	0.040	0.057	0.079
DFW	0.020	0.028	0.039	0.055	0.078
WAS	0.017	0.023	0.033	0.046	0.064
DET	0.018	0.023	0.032	0.046	0.064
MSP	0.016	0.022	0.031	0.044	0.061
EWR	0.014	0.019	0.027	0.038	0.053
IAH	0.013	0.019	0.026	0.037	0.051
SEA	0.013	0.018	0.025	0.036	0.049
ATL	0.012	0.017	0.024	0.034	0.048
BOS	0.011	0.016	0.022	0.031	0.044
MKC	0.009	0.013	0.018	0.026	0.036
PHL	0.009	0.013	0.018	0.025	0.035
DEN	0.009	0.013	0.018	0.025	0.035
CLE	0.009	0.012	0.017	0.024	0.034
PIT	0.009	0.012	0.017	0.024	0.034
STL	0.007	0.010	0.014	0.020	0.028
MSY	0.006	0.008	0.011	0.016	0.022
LAS	0.004	0.006	0.008	0.011	0.016
BAL	0.003	0.004	0.006	0.009	0.012

HIGH DENSITY HUBS (50nm radius)

OKC	0.029	0.041	0.057	0.081	0.113
SAN	0.027	0.039	0.054	0.076	0.107
TUL	0.026	0.036	0.051	0.071	0.100
RIV	0.025	0.036	0.050	0.071	0.099
SJC	0.025	0.035	0.049	0.069	0.096
PDX	0.024	0.034	0.047	0.067	0.093
IND	0.024	0.033	0.046	0.065	0.091
TPA	0.023	0.032	0.045	0.063	0.088
MKE	0.022	0.031	0.043	0.060	0.084
PHX	0.021	0.029	0.041	0.057	0.080
SAC	0.018	0.028	0.036	0.051	0.072
CMH	0.018	0.026	0.036	0.050	0.070
LOU	0.018	0.025	0.035	0.049	0.068
MEM	0.016	0.022	0.031	0.044	0.061
BDL	0.015	0.020	0.029	0.040	0.056
BUF	0.014	0.020	0.028	0.040	0.056
CMA	0.014	0.019	0.027	0.038	0.053
ABQ	0.013	0.018	0.025	0.036	0.050
CIN	0.012	0.017	0.024	0.034	0.047
JAX	0.012	0.017	0.024	0.034	0.047
ORL	0.011	0.015	0.021	0.030	0.042
TUS	0.010	0.014	0.020	0.028	0.040
SAT	0.010	0.014	0.020	0.028	0.039
GSO	0.010	0.014	0.019	0.027	0.038
DAY	0.009	0.013	0.018	0.026	0.036
PBI	0.009	0.013	0.018	0.025	0.036
GEG	0.008	0.012	0.017	0.023	0.033
SLC	0.008	0.011	0.015	0.021	0.030
ORF	0.008	0.011	0.015	0.021	0.030
ROC	0.007	0.009	0.013	0.018	0.026
ELP	0.006	0.008	0.012	0.016	0.023
RIC	0.006	0.008	0.012	0.016	0.023
RNO	0.005	0.008	0.011	0.015	0.021
BNA	0.005	0.007	0.010	0.014	0.020
SYR	0.005	0.007	0.010	0.014	0.020
CLT	0.005	0.007	0.010	0.013	0.019
RDU	0.004	0.006	0.009	0.012	0.017

MEDIUM DENSITY HUBS (30nm radius)

Figure C-13: AIRCRAFT DENSITY AT THE 60 TOP HUBS (Aircraft per square nautical mile)

References

C_1 Cohen, S., Maginnis, F., "Statistical Summary for Los Angeles Basin Standard Traffic Model", MITRE MTR 6387, April 1973.

C_2 Goldman, D., "Air Traffic Activity Projections for 1995", MITRE MTR 6419 series 3, March 1974.

APPENDIX D

RADAR COVERAGE

The passive BCAS derives its proximity information from ground radar interrogations and airborne transponder replies. Therefore passive mode BCAS operation is limited to areas of suitable ground radar coverage and geometry. This may be contrasted with active BCAS operation which derives all of its data from air-to-air interrogation and reply.

COVERAGE

Low altitude radar coverage is illustrated in Figures D-1 through D-4 for the 88 FAA enroute and 162 FAA terminal radars in CONUS. The airport surveillance radars are plotted for equivalent heights of 1250 and 5000 foot altitudes (50 and 100 nm ranges). The air route surveillance radars shows coverage for 5000 and 20,000 foot altitudes (100 and 200 nm ranges). These figures illustrate the vast areas of CONUS which have no low altitude radar coverage at all, including significant areas in congested regions. Active ranging techniques must be employed in areas with no coverage to provide adequate collision protection.

A radar coverage computer program ("CIRCLE") was developed to plot the local coverage limit envelopes for radars at the top 60 hubs. The program used a file of the locations of 698 CONUS radars active as of 1976. The output is a series of 120 plots centered at the principal airport of each of the 60 major hubs at 4000 ft. and 1000 ft. altitudes and are included as Attachment 1 of this Appendix. This included the 23 high density and 37 medium density hubs classified by revenue passenger enplanements, and the 301 within those 60 hubs [2]. An example is given in Figure D-5 which illustrates the coverage limit at 1000 ft. altitude of the four radars in the vicinity of the New Orleans' Moisant airport. As in all the other plots, the output assumes a smooth spherical Earth line-of-sight limitation on radar reception. Terrain and buildings will seriously reduce the envelopes but were too complex an issue to be dealt with properly within the constraints of this analysis. Multipath problems would also limit the usefulness of the signals at certain azimuths and elevations. These effects were also considered too complex to be treated here, although excellent treatments of both ground-to-air and air-to-air multipath are available in recent reports (15, 16).

In Figure D-5 the numbers on the plot are locations of the radars, and 45 nm radius circles are drawn about each indicating the reception limit at 1000 ft. altitude. There

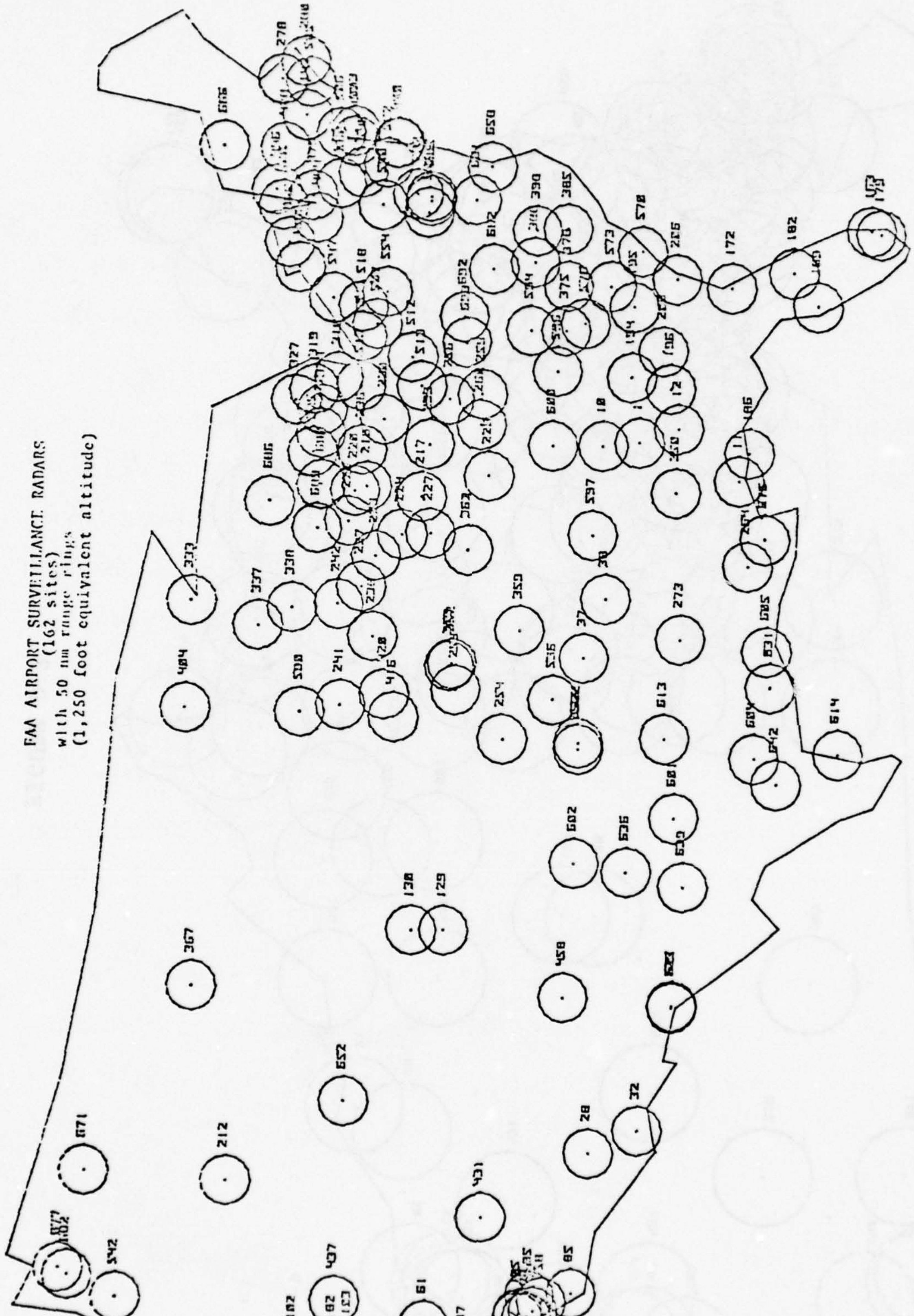

FAA AIRPORT SURVEILLANCE RADARS
(162 sites)
with 50 nm range rings
(1,250 foot equivalent altitude)

FIGURE D-1

FAA AIRPORT SURVEILLANCE RADARS
(162 sites)
with 100 nm range rings
(5,000 foot equivalent altitude)

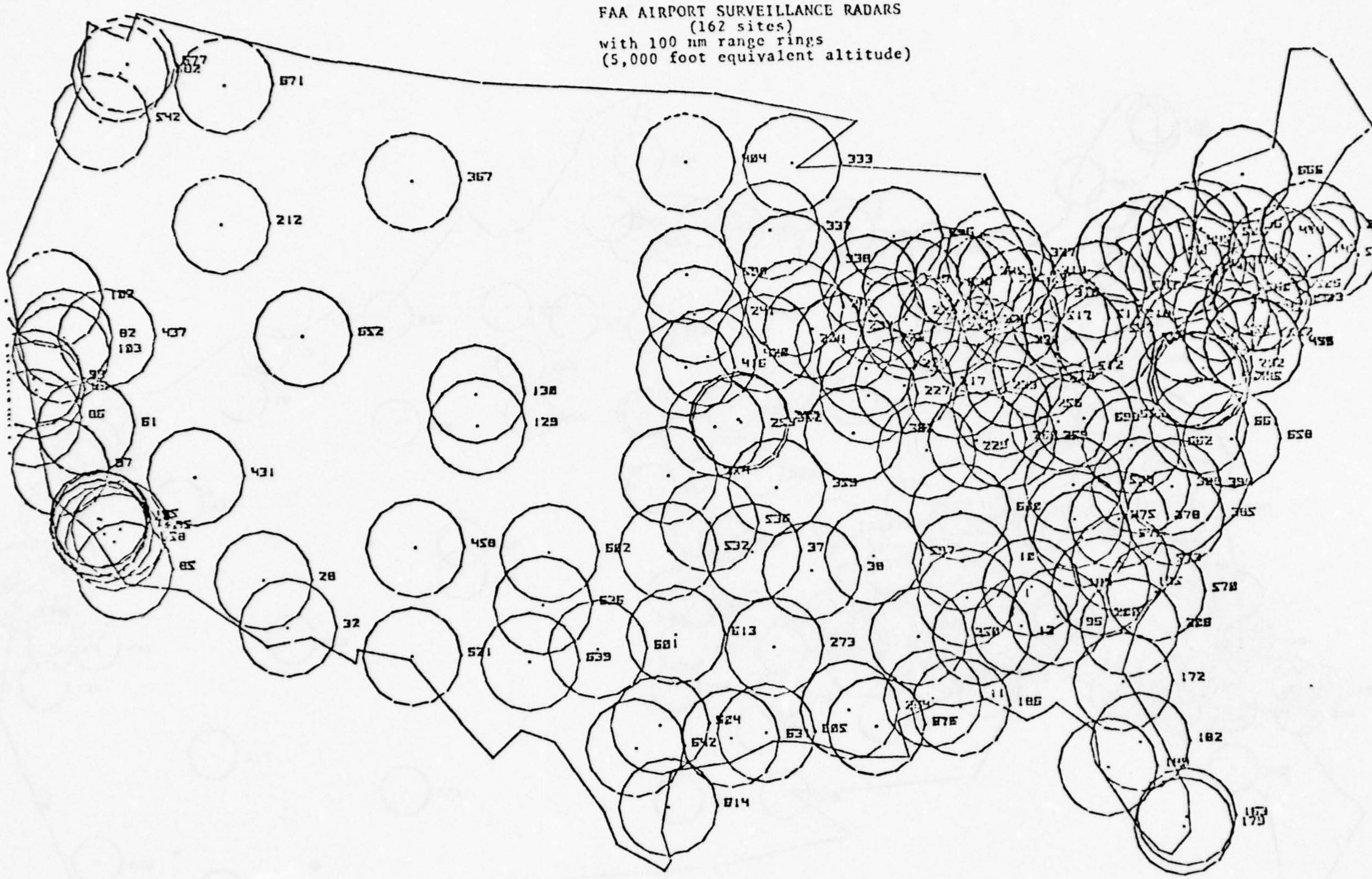


FIGURE D-2

FAA ENROUTE RADARS (88 sites)
with 100 nm range rings
(5,000 foot equivalent altitude)

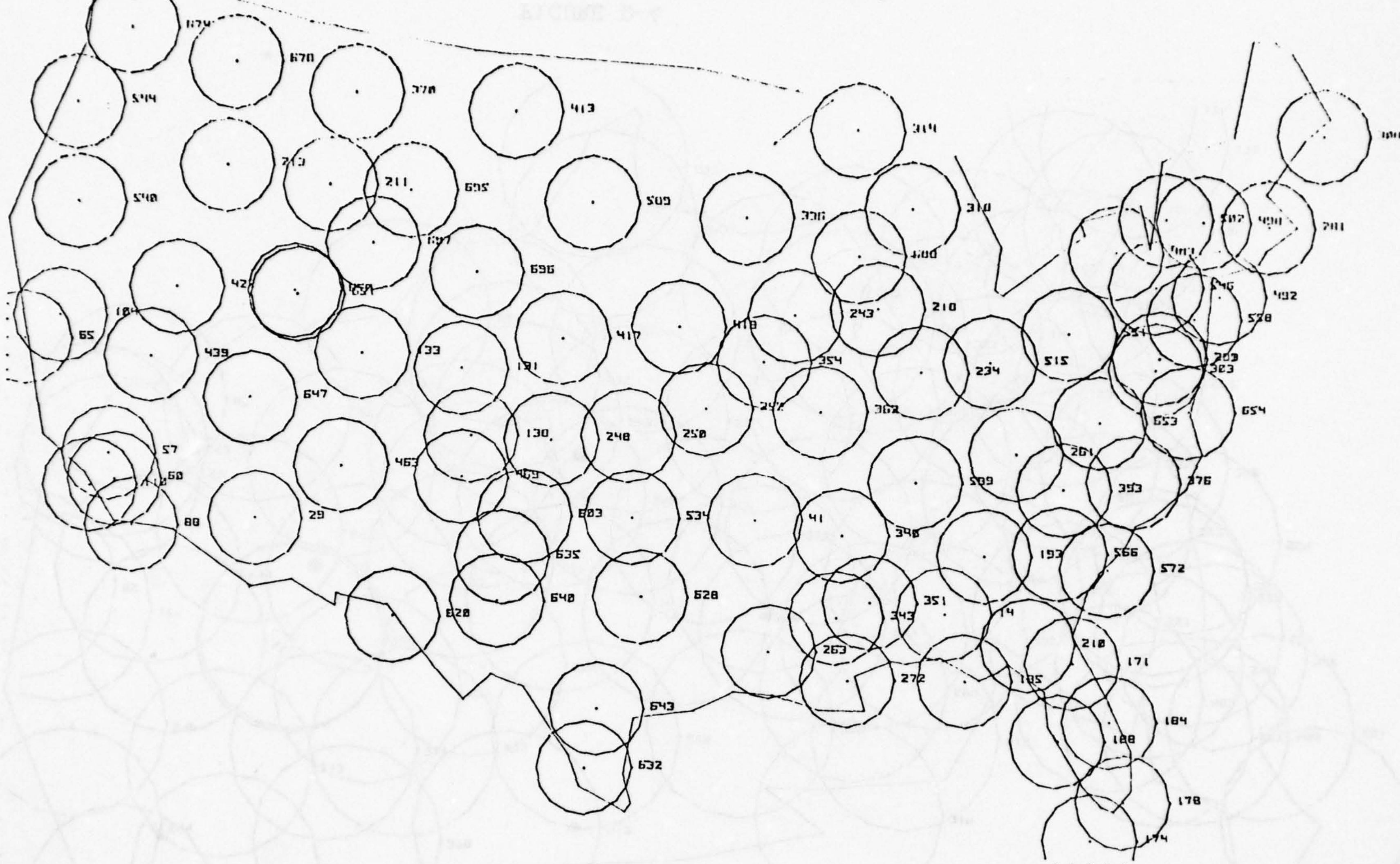


FIGURE D-3

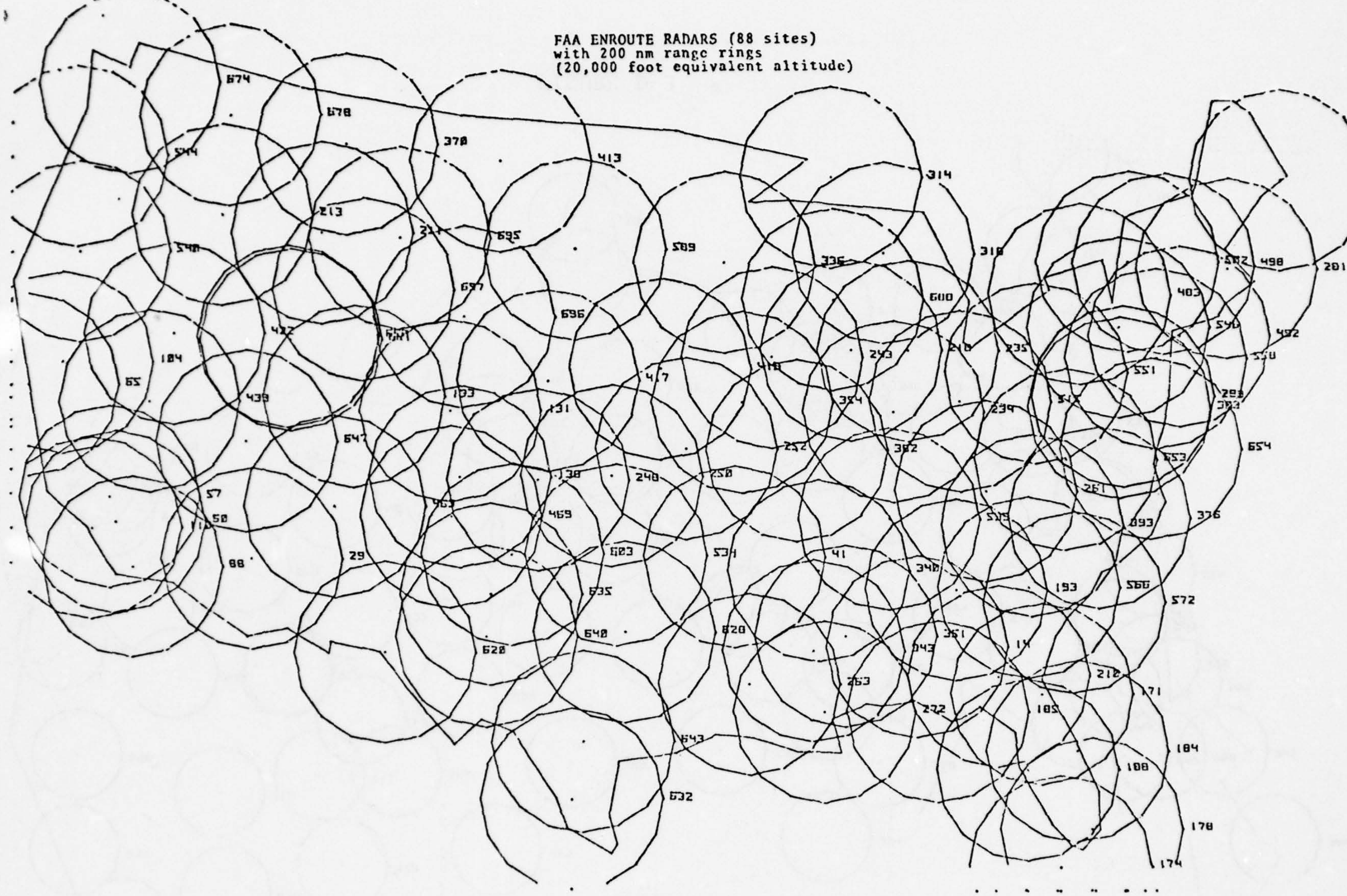

FAA ENROUTE RADARS (88 sites)
with 200 nm range rings
(20,000 foot equivalent altitude)
674
678
370
413
314
544
213
695
509
318
336
202
498
201
540
600
403
540
492
104
422
696
210
235
530
52
439
193
417
418
243
521
131
324
234
288
393
647
232
302
654
653
130
240
250
261
57
50
462
469
575
093
376
88
29
603
534
41
340
635
193
566
572
640
620
820
351
043
14
218
263
272
185
171
184
643
108
632
178
174

FIGURE D-4

M S Y

NEW ORLEANS (MOISANT)

HEIGHT 1000   GIVES RADIUS 44.72135
SIZE OF AREA <RADIUS (NM)> 60

FILE # 271 USED AS NOMINAL SITE

RADAR # 270 WITHIN 17.84088285
RADAR # 271 WITHIN 0   NM
RADAR # 272 WITHIN 37.3495143
RADAR # 616 WITHIN 0   NM
***** ***** ***** ***** *****

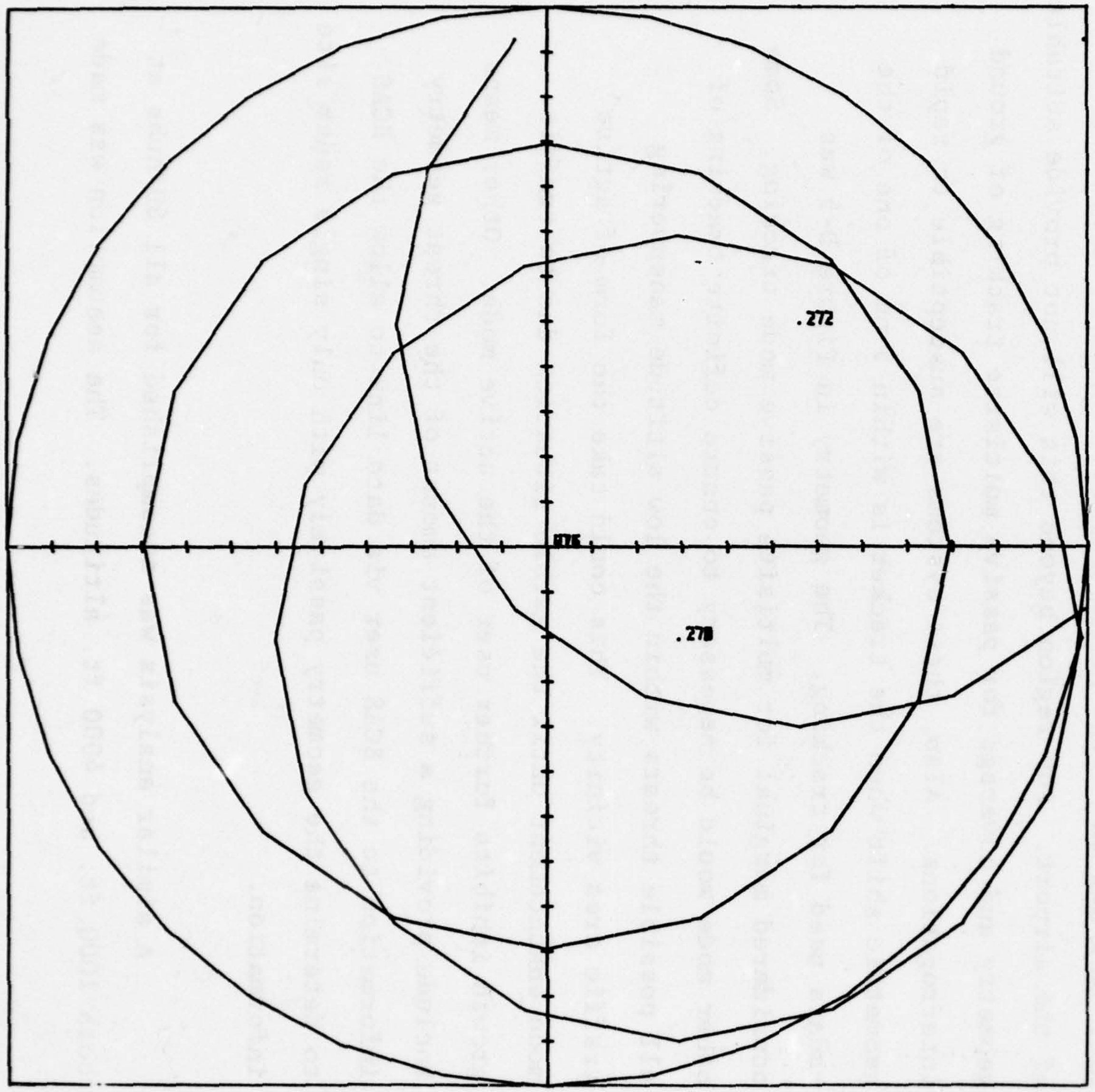


FIGURE D-5 RADAR COVERAGE PLOT INDICATING THE RECEPTION LIMITS AT 1000'

is also a 60 nm radius range ring drawn about Moisant for reference. It can be seen that approaching from the Southwest, coverage from radar #272 is not obtained until within 7 nm of the airport which allows about two minutes of tracking time. It can be seen that the region in Figure D-5 suitable for multisite passive BCAS is limited to a roughly 40 by 30 nm region including all the radar positions and located to the Northeast of the airport. Any region beyond this will not provide suitable geometry and coverage for passive multisite tracking of ground interrogations. Also, these systems are susceptible to rapid geometric shift when the tracker is within 5 nm of one of the radars used for tracking. The geometry in Figure D-5 was considered marginal for multisite passive mode tracking. Some other mode would be necessary to ensure definite tracking of all possible threats within the low altitude maneuvering traffic area vicinity. This could take the form of active mode enhancement until the garble situation due to traffic growth inhibits further user of the active mode. Other means include providing a sufficient amount of the threat geometry information to the BCAS user via data link to allow the BCAS to determine the geometry passively with only single radar site information.

A similar analysis was accomplished for all 60 hubs at both 1000 ft. and 4000 ft. altitudes. The assumption was made

	@ 4000 FT ALTITUDE	@ 1000 FT ALTITUDE
HUBS	12	40
AIRPORTS	54	191
AC	17	57
GA	37	134

FIGURE D-6 HUBS AND AIRPORT WHERE RADAR COVERAGE LIMITS BCAS USE

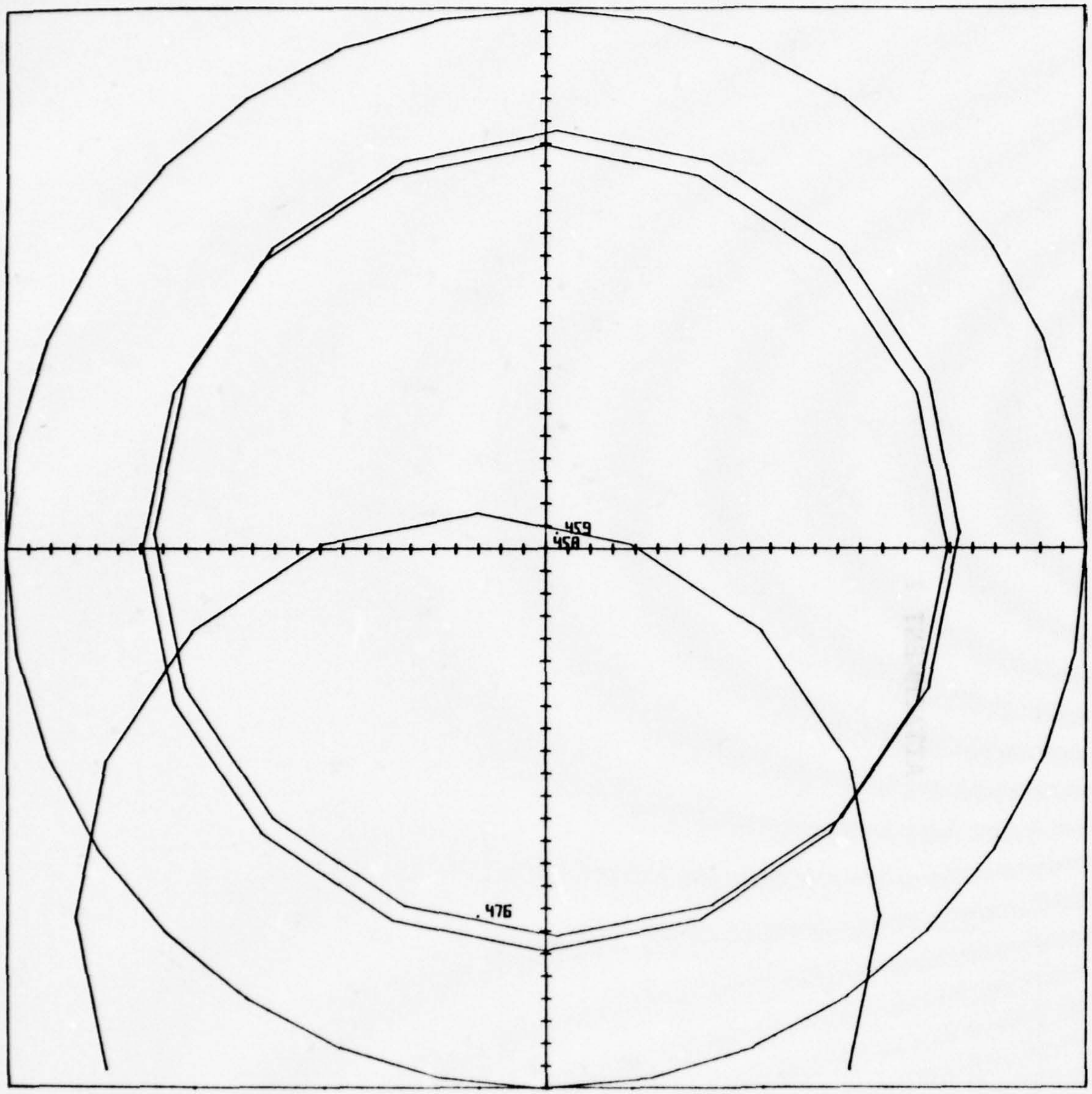
that the radar deployment would remain constant (i.e., only replacing existing sites with newer equipment, no decommissioning of old sites or commmissioning of new ones). Figure D-6 summarizes these results by the total hubs lost at each altitude, and the total airports and types of airports within these hubs.

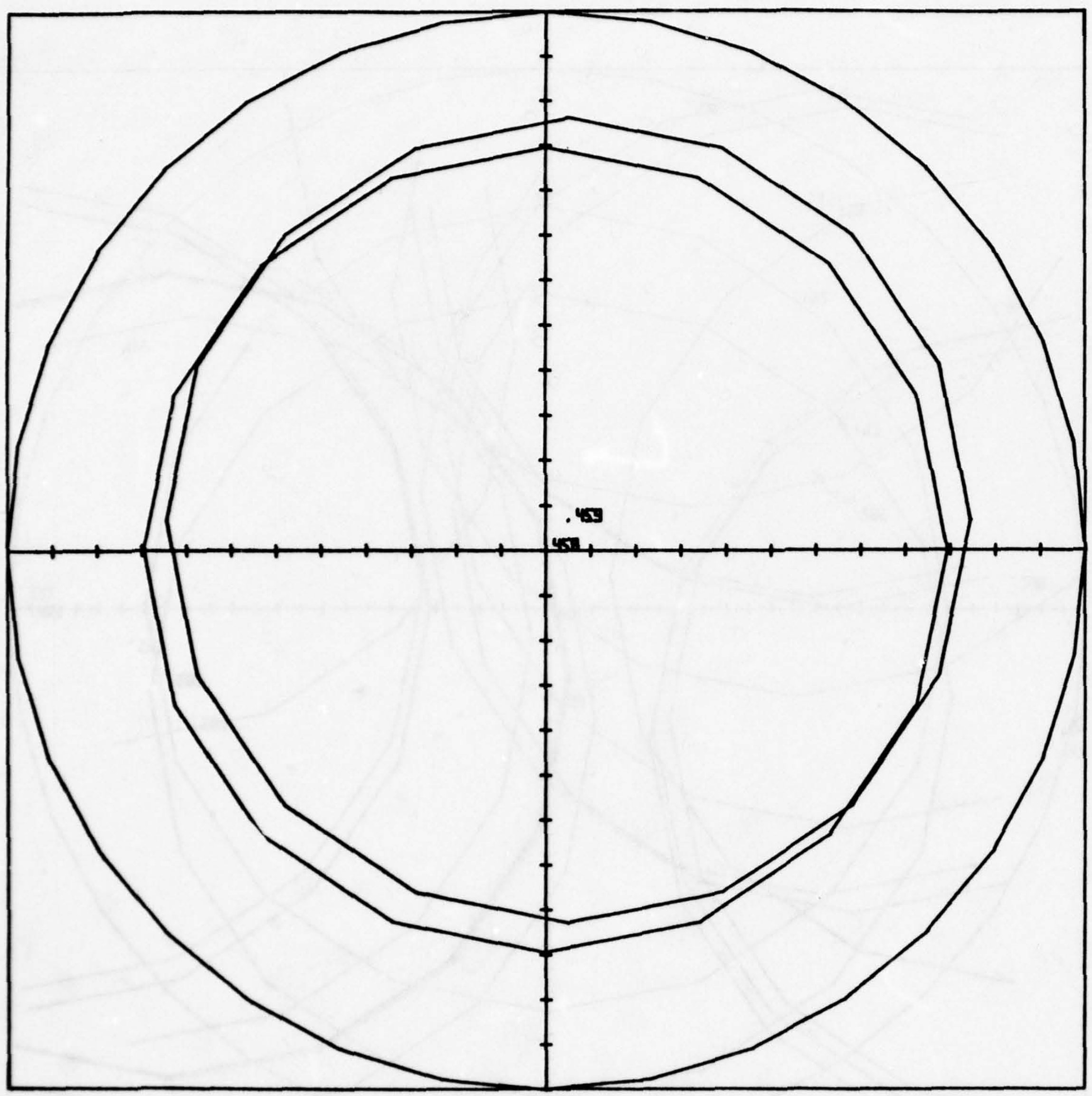
APPENDIX D

ATTACHMENT 1

ABQ

ALBEQUERQUE, N. M.





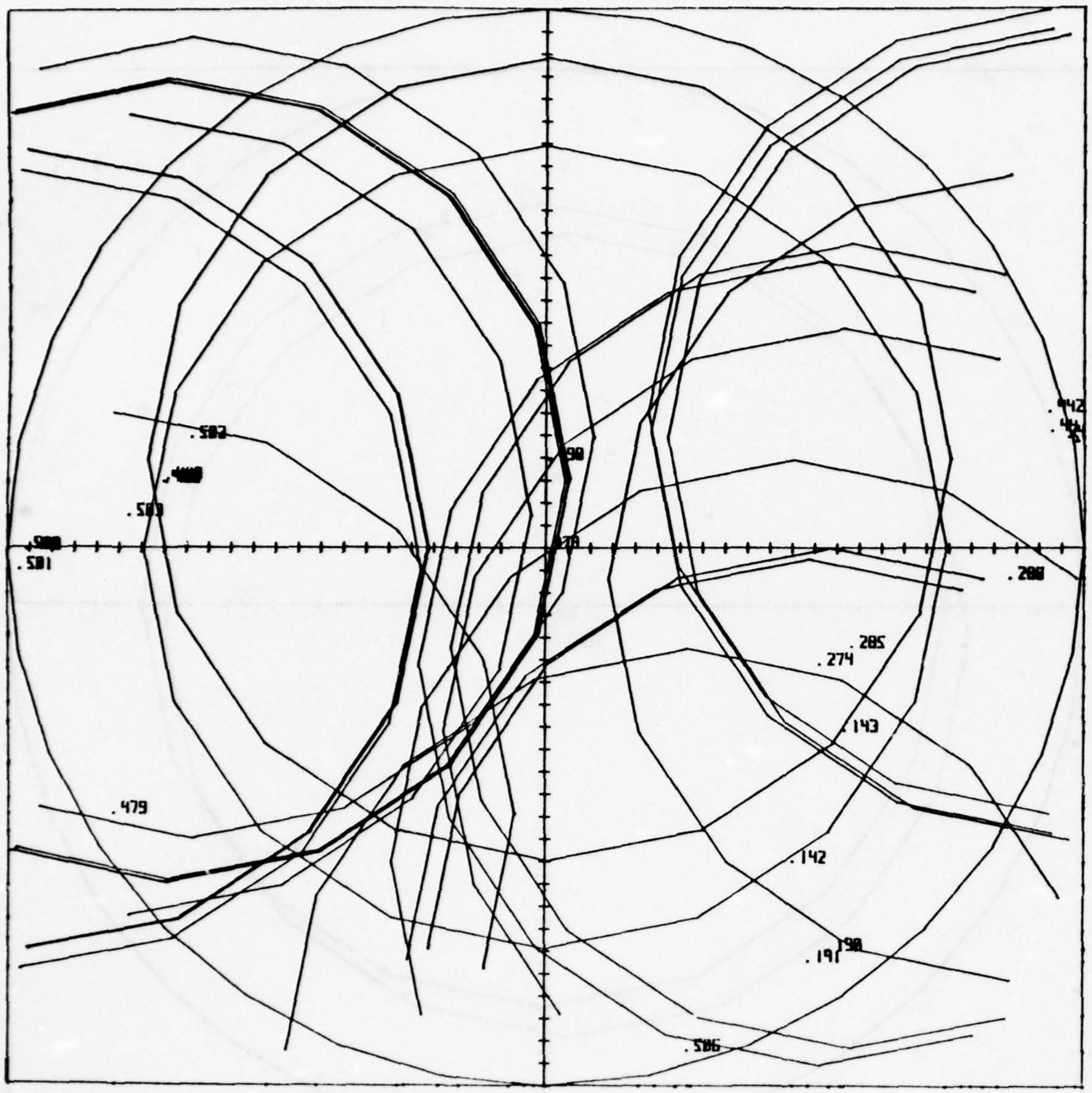
ABQ

ALBEQUERQUE, N. M.

HEIGHT 1000 GIVES RADIUS 44.72135955
SIZE OF AREA <RADIUS (NM)>.60

FILE # 458 USED AS NOMINAL SITE :

RADAR # 458 WITHIN 0 NM
RADAR # 459 WITHIN 4.172479257 NM
***** ***** ***** ***** *****



ALB

ALBANY, N. Y.

HEIGHT 4000   GIVES RADIUS 89.44271910
SIZE OF AREA (RADIUS (NM)) 120

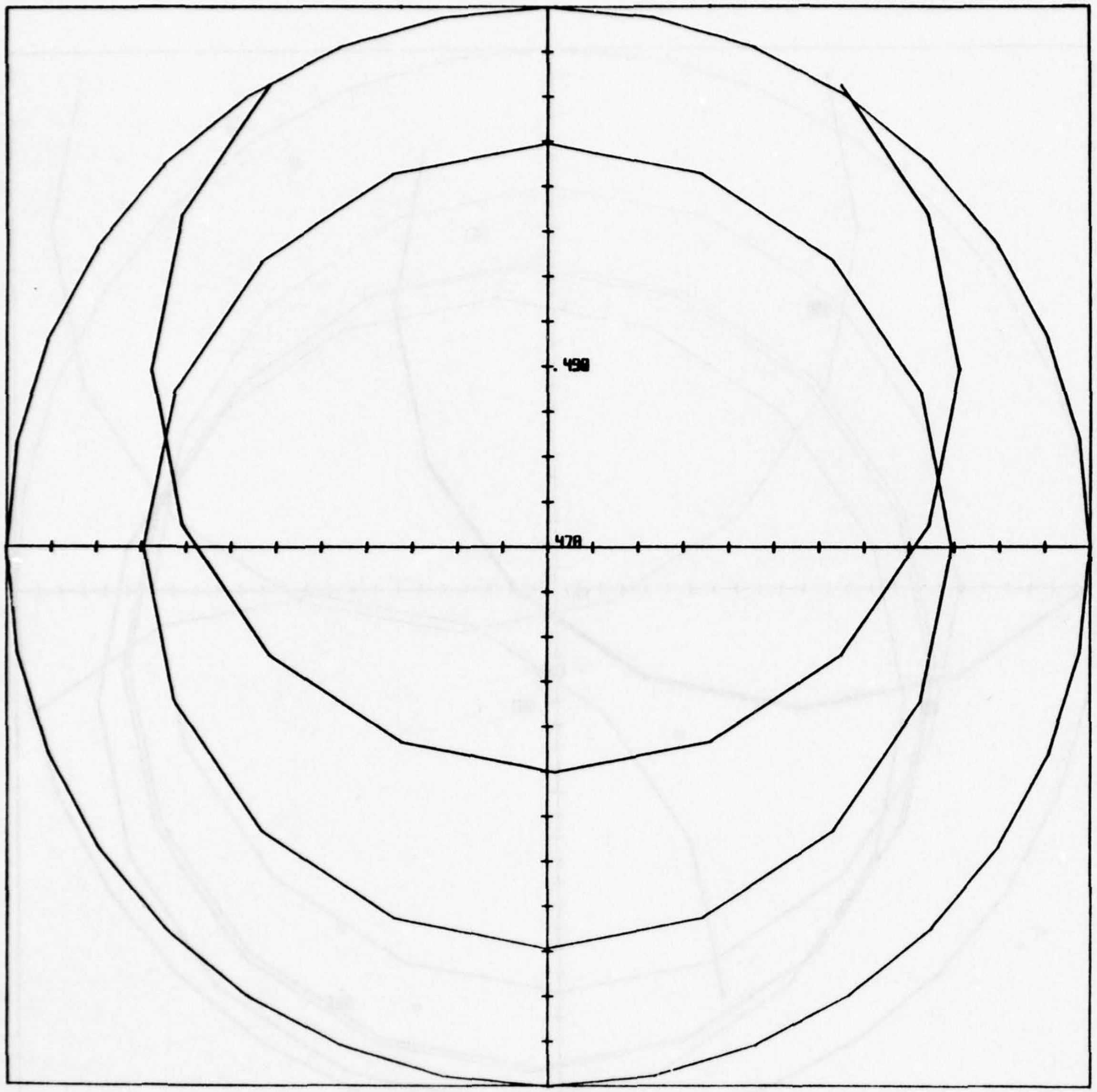
FILE # 478 USED AS NOMINAL SITE

RADAR #	139	WITHIN	109.7493567	NM
RADAR #	140	WITHIN	109.7493567	
RADAR #	141	WITHIN	109.1919462	
RADAR #	142	WITHIN	89.17872078	
RADAR #	143	WITHIN	78.26704642	
RADAR #	274	WITHIN	66.53101686	
RADAR #	285	WITHIN	71.87554445	
RADAR #	286	WITHIN	103.8452311	
RADAR #	287	WITHIN	103.8452311	
RADAR #	442	WITHIN	116.302905	
RADAR #	444	WITHIN	119.2110534	
RADAR #	445	WITHIN	115.8598182	
RADAR #	478	WITHIN	0	NM
RADAR #	479	WITHIN	113.1774329	
RADAR #	486	WITHIN	85.59672118	
RADAR #	487	WITHIN	85.59672118	
RADAR #	488	WITHIN	85.36521323	
RADAR #	489	WITHIN	115.4732462	
RADAR #	496	WITHIN	86.3098197	
RADAR #	497	WITHIN	19.60344353	
RADAR #	498	WITHIN	19.60344353	
RADAR #	500	WITHIN	115.7971344	
RADAR #	501	WITHIN	117.2928207	
RADAR #	502	WITHIN	83.31687758	NM
RADAR #	503	WITHIN	93.01890187	NM
RADAR #	506	WITHIN	116.5107738	NM

***** ***** ***** ***** *****

ALB

ALBANY, N. Y.



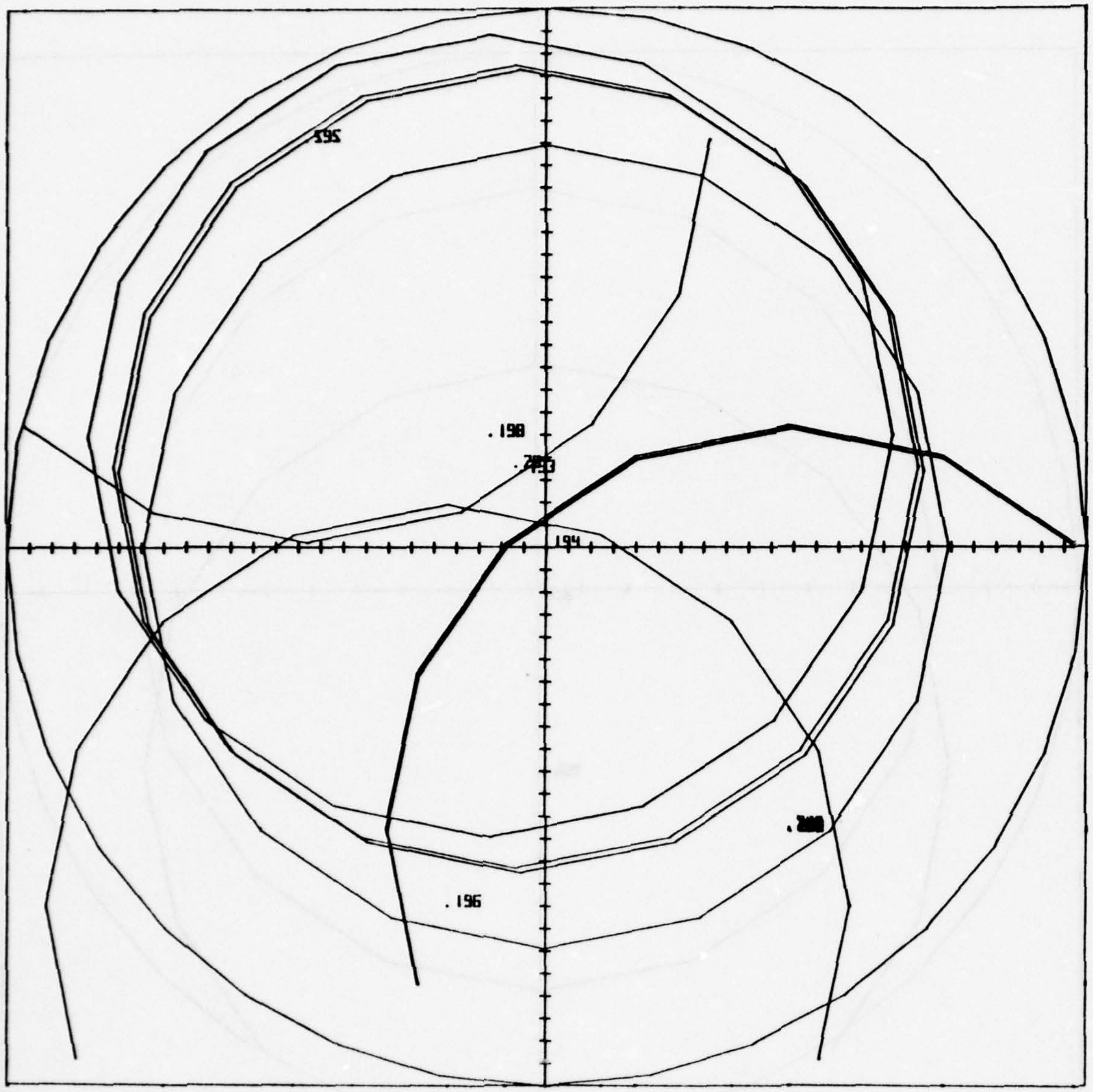
HEIGHT 1[illegible] -135955
SIZE OF AREA (RADIUS (NM)) 60

FILE # 478 USED AS NOMINAL SITE

RADAR # 478 WITHIN 0 NM
RADAR # 497 WITHIN 19.60344353 NM
RADAR # 498 WITHIN 19.60344353 NM
***** * *****

ATL

ATLANTA, GA.



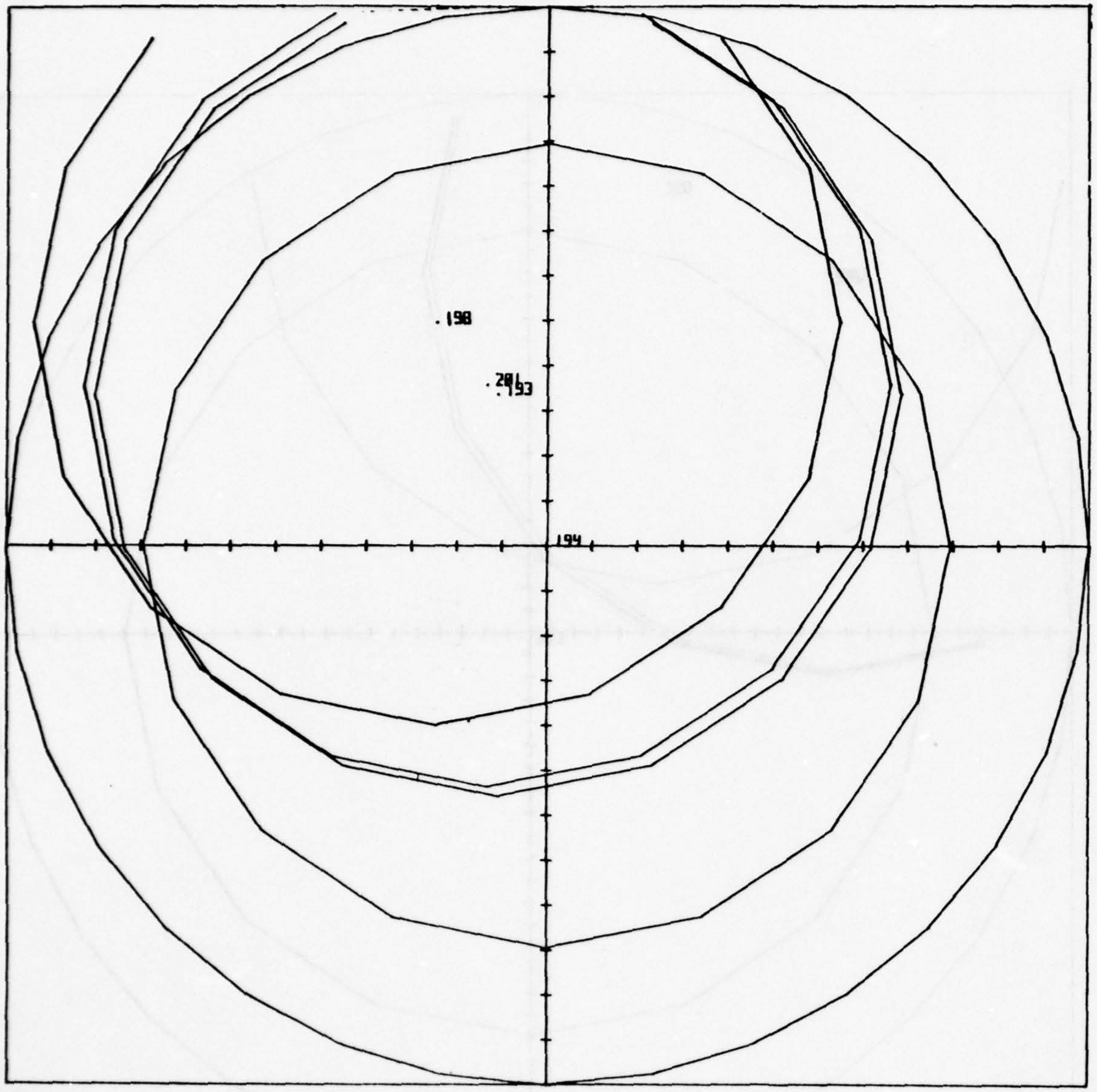

```
IGHT 4000    GIVES RADIUS 89.44271
ZE OF AREA (RADIUS (NM)) 120

LE # 194  USED AS NOMINAL SITE

RADAR # 193  WITHIN 17.70523598
RADAR # 194  WITHIN 0     NM
RADAR # 196  WITHIN 82.86000686
RADAR # 198  WITHIN 27.65313172
RADAR # 199  WITHIN 27.65313172
RADAR # 200  WITHIN 82.60541183
RADAR # 201  WITHIN 19.08309648
RADAR # 202  WITHIN 83.04601301
RADAR # 203  WITHIN 83.47001504
RADAR # 595  WITHIN 104.82077  NM
***  *****  *****  *****  *****
```

ATL

ATLANTA, GA.



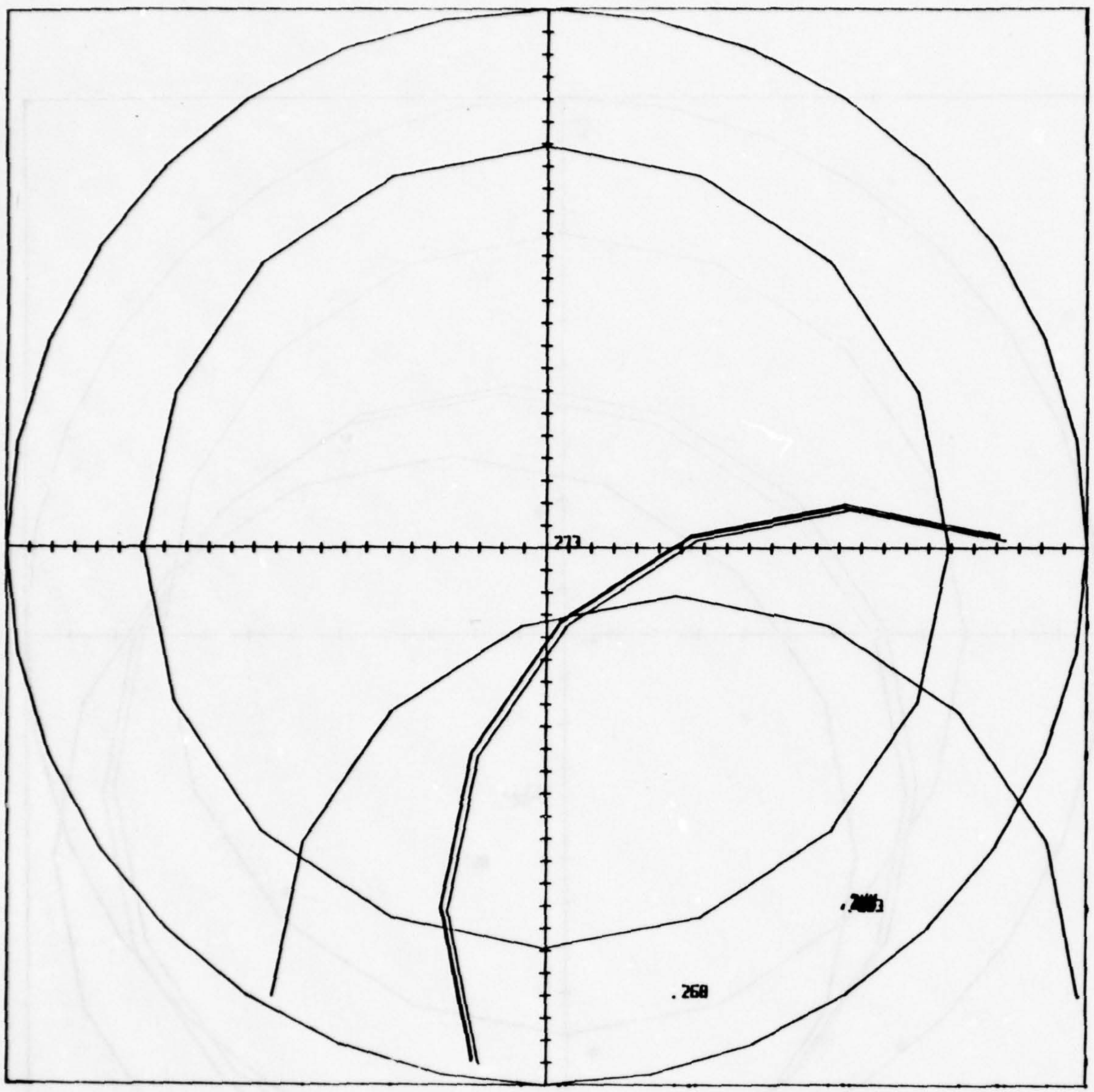

```
ATLG                                    ...955
SIZE OF AREA (RADIUS (NM)) 60

FILE # 194  USED AS NOMINAL SITE

  RADAR # 193  WITHIN 17.70523598   NM
  RADAR # 194  WITHIN 0    NM
  RADAR # 198  WITHIN 27.65313172   NM
  RADAR # 199  WITHIN 27.65313172   NM
  RADAR # 201  WITHIN 19.08309648   NM
*****  *****  *****  *****  *****
```

BAD

SHREVEPORT, LA.
BARKSDALE AFB



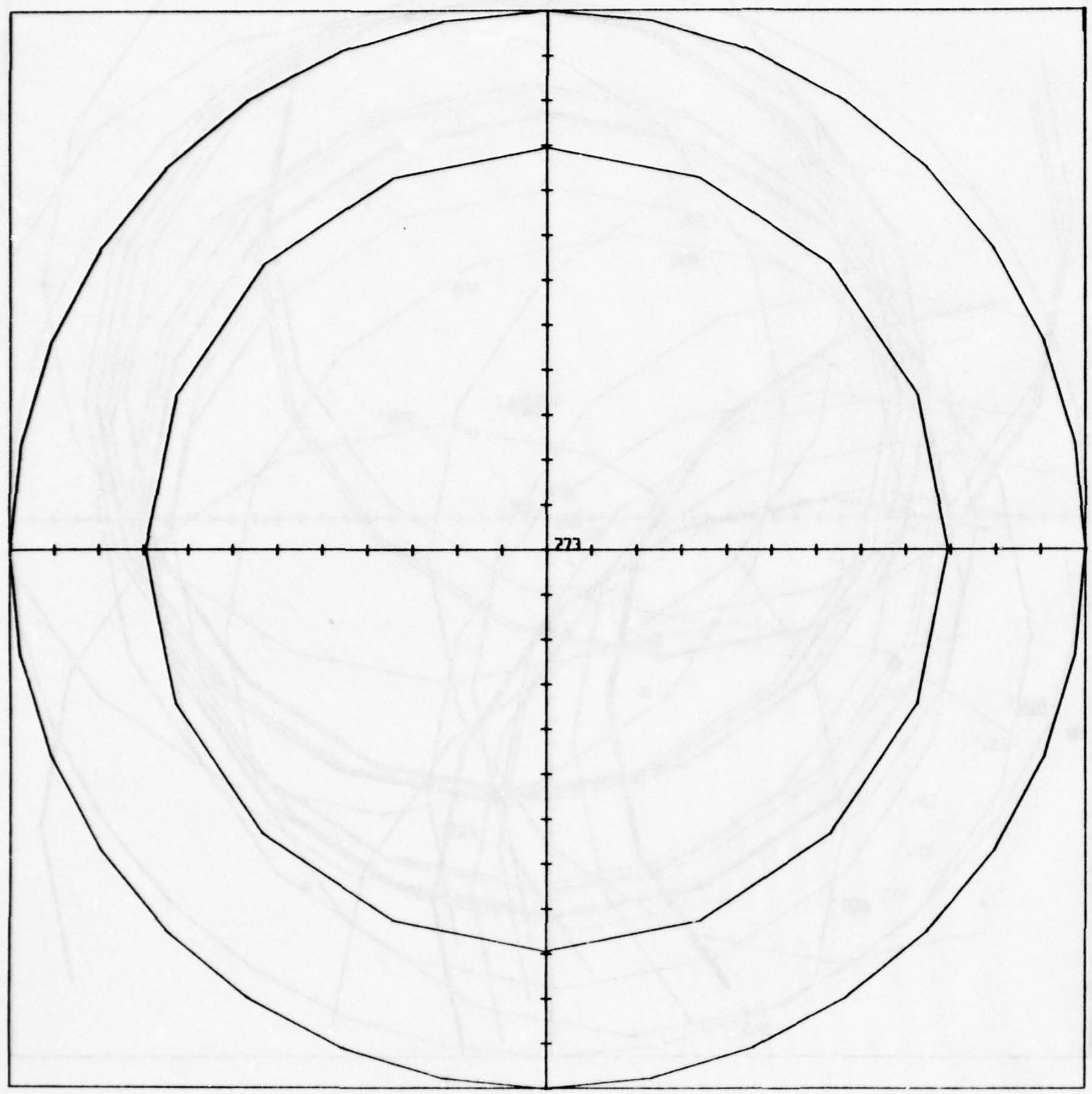

```
  IGHT 4000    GIVE  RADIUS 89.44271
  ZE OF AREA (RADIUS (NM)) 120

  LE # 273  USED AS NOMINAL SITE

  RADAR # 263  WITHIN 105.5015929
  RADAR # 265  WITHIN 103.7005750
  RADAR # 266  WITHIN 104.0601616
  RADAR # 267  WITHIN 104.0157443
  RADAR # 268  WITHIN 104.1678465
  RADAR # 273  WITHIN 0    NM
  ***  *****  *****  *****  *****
```

BAD

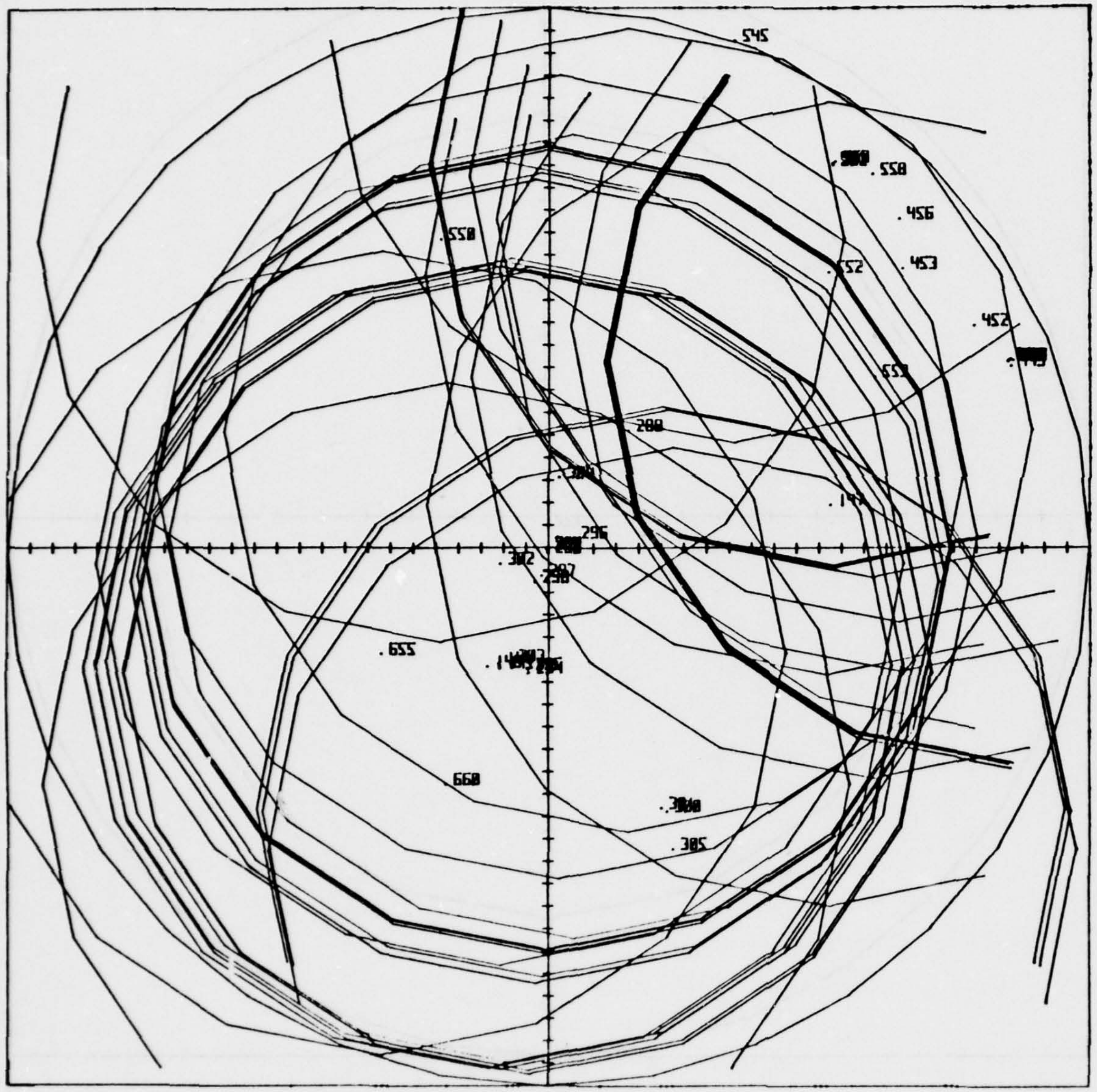
SHREVEPORT, LA.
BARKSDALE AFB



JGHT 1000   GIVES RADIUS 44.7213
LE OF AREA RADIUS (NM) 60

LE # 273 USED AS NOMINAL SITE

RADAR # 273 WITHIN 0   NM
*** ***** ***** ***** *****



BAL

BALTIMORE, MD.

HEIGHT 4000 GIVES RADIUS 89.44271919
SIZE OF AREA (RADIUS (NM)) 120

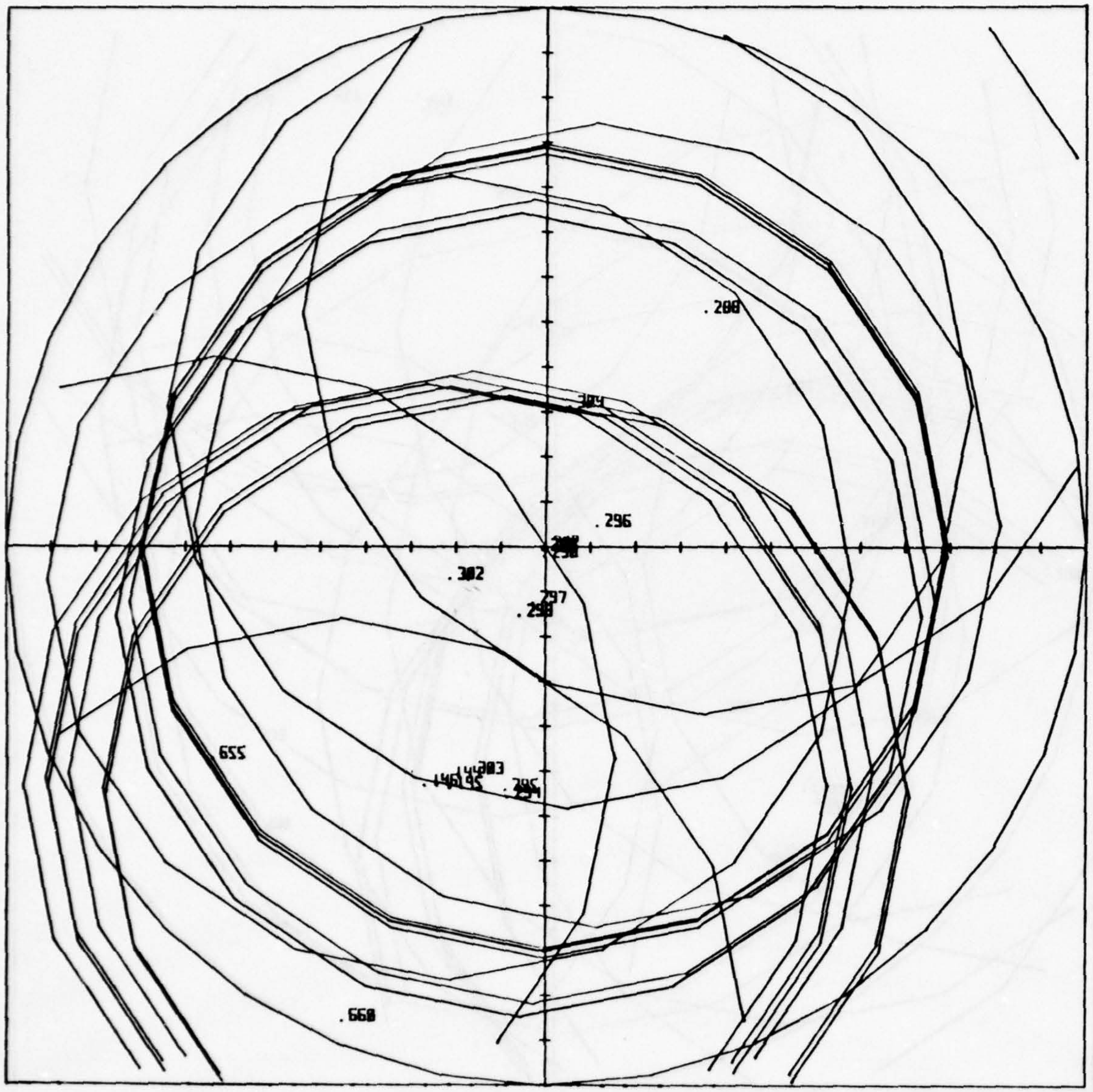
E # 292 USED AS NOMINAL SITE

RADAR #	144	WITHIN	27.95551345	N
RADAR #	145	WITHIN	28.9187293	N
RADAR #	146	WITHIN	29.80255877	N
RADAR #	147	WITHIN	63.34142049	N
RADAR #	288	WITHIN	31.4835167	N
RADAR #	289	WITHIN	0.42903919	N
RADAR #	290	WITHIN	1.0913157 NM	
RADAR #	291	WITHIN	0.42903919	N
RADAR #	292	WITHIN	0 NM	
RADAR #	293	WITHIN	0.42903919	N
RADAR #	294	WITHIN	28.24490476	N
RADAR #	295	WITHIN	27.48108632	N
RADAR #	296	WITHIN	6.186925724	N
RADAR #	297	WITHIN	6.339224744	N
RADAR #	298	WITHIN	8.188976157	N
RADAR #	299	WITHIN	8.188976157	N
RADAR #	300	WITHIN	64.43307928	N
RADAR #	301	WITHIN	63.31668500	N
RADAR #	302	WITHIN	11.2287847	N
RADAR #	303	WITHIN	26.56541653	N
RADAR #	304	WITHIN	15.76525963	N
RADAR #	305	WITHIN	72.67087344	N
RADAR #	446	WITHIN	111.062201	N
RADAR #	447	WITHIN	109.97609 NM	
RADAR #	448	WITHIN	110.6873773	N
RADAR #	449	WITHIN	110.2108459	N
RADAR #	450	WITHIN	111.062201	N
RADAR #	451	WITHIN	110.3594741	N
RADAR #	452	WITHIN	106.5883777	N
RADAR #	453	WITHIN	99.92510143	N
RADAR #	456	WITHIN	106.6059895	N
RADAR #	545	WITHIN	119.9544638	N
RADAR #	550	WITHIN	75.5612777	N
RADAR #	552	WITHIN	87.06819702	N
RADAR #	553	WITHIN	81.70234929	N
RADAR #	558	WITHIN	109.6996426	N
RADAR #	561	WITHIN	106.1148417	N
RADAR #	562	WITHIN	105.8338174	N
RADAR #	563	WITHIN	106.8840459	N
RADAR #	655	WITHIN	43.8800324	N
RADAR #	660	WITHIN	57.4238176	N

*** ***** ***** ***** *****

BAL

BALTIMORE, MD.



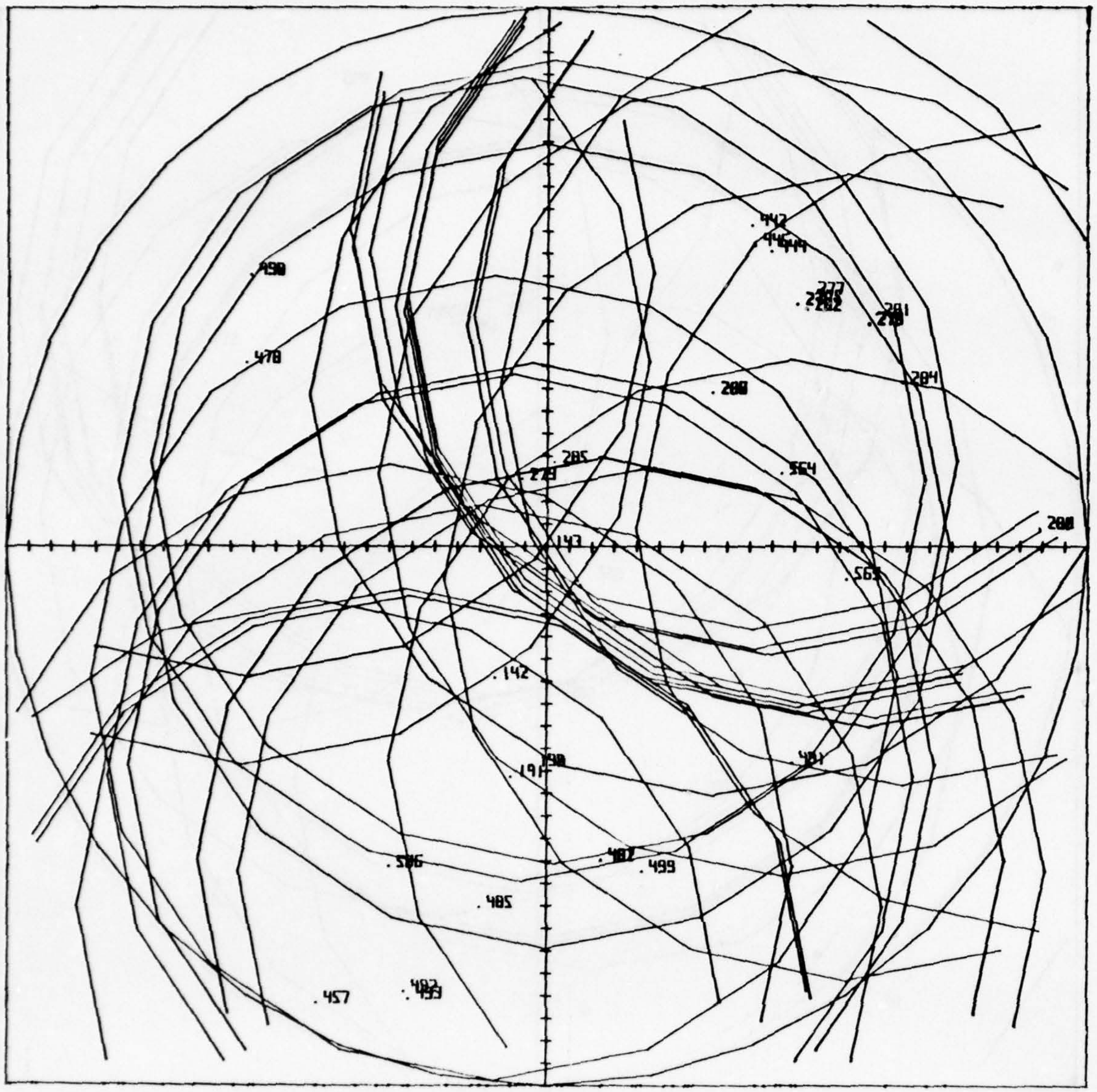
HEIGHT 100 5955
SIZE OF AREA RADIUS (NM) 60

FILE # 292 USED AS NOMINAL SITE

RADAR #	144	WITHIN	27.95551345	NM
RADAR #	145	WITHIN	28.9187293	NM
RADAR #	146	WITHIN	29.80255877	NM
RADAR #	288	WITHIN	31.4835167	NM
RADAR #	289	WITHIN	0.42903919	NM
RADAR #	290	WITHIN	1.0413157	NM
RADAR #	291	WITHIN	0.42903919	NM
RADAR #	292	WITHIN	0	NM
RADAR #	293	WITHIN	0.42903919	NM
RADAR #	294	WITHIN	28.24490476	NM
RADAR #	295	WITHIN	27.48180032	NM
RADAR #	296	WITHIN	6.180925724	NM
RADAR #	297	WITHIN	6.339224744	NM
RADAR #	298	WITHIN	8.188976157	NM
RADAR #	299	WITHIN	8.188976157	NM
RADAR #	302	WITHIN	11.22878427	NM
RADAR #	303	WITHIN	26.56541653	NM
RADAR #	304	WITHIN	15.76525963	NM
RADAR #	655	WITHIN	43.83802324	NM
RADAR #	660	WITHIN	57.[illegible]	NM

BDL

HARTFORD, CONN.
(WINDSOR LOCKS)



HEIGHT 4000 GIVES RADIUS 89.44271910
SIZE OF AREA (RADIUS (NM)) 120

ITE # 143 USED AS NOMINAL SITE

RADAR	# 139	WITHIN	48.86355161		NM
RADAR	# 140	WITHIN	48.86355161		NM
RADAR	# 141	WITHIN	51.86571278		NM
RADAR	# 142	WITHIN	31.46879664		NM
RADAR	# 143	WITHIN	0	NM	
RADAR	# 274	WITHIN	15.86188485		N
RADAR	# 275	WITHIN	79.46762613		N
RADAR	# 276	WITHIN	77.32969211		N
RADAR	# 277	WITHIN	80.82907843		N
RADAR	# 278	WITHIN	86.83745732		N
RADAR	# 279	WITHIN	86.72536753		N
RADAR	# 280	WITHIN	109.3390465		N
RADAR	# 281	WITHIN	89.3335783		N
RADAR	# 282	WITHIN	77.96006745		N
RADAR	# 284	WITHIN	86.94704374		N
RADAR	# 285	WITHIN	18.79383347		
RADAR	# 286	WITHIN	50.12678915		
RADAR	# 287	WITHIN	50.12678915		
RADAR	# 442	WITHIN	64.35461461		
RADAR	# 444	WITHIN	82.16837354		
RADAR	# 445	WITHIN	81.08160093		
RADAR	# 457	WITHIN	113.5120946		
RADAR	# 478	WITHIN	78.26704642		
RADAR	# 481	WITHIN	70.72530565		
RADAR	# 482	WITHIN	76.91024273		
RADAR	# 485	WITHIN	81.60028032		
RADAR	# 491	WITHIN	72.61827164		
RADAR	# 492	WITHIN	103.8071919		
RADAR	# 493	WITHIN	105.0138016		
RADAR	# 497	WITHIN	89.88754324		
RADAR	# 498	WITHIN	89.88754324		
RADAR	# 499	WITHIN	75.34418289		
RADAR	# 506	WITHIN	79.39602713		NM
RADAR	# 564	WITHIN	54.47599741		NM
RADAR	# 565	WITHIN	66.9754223		NM

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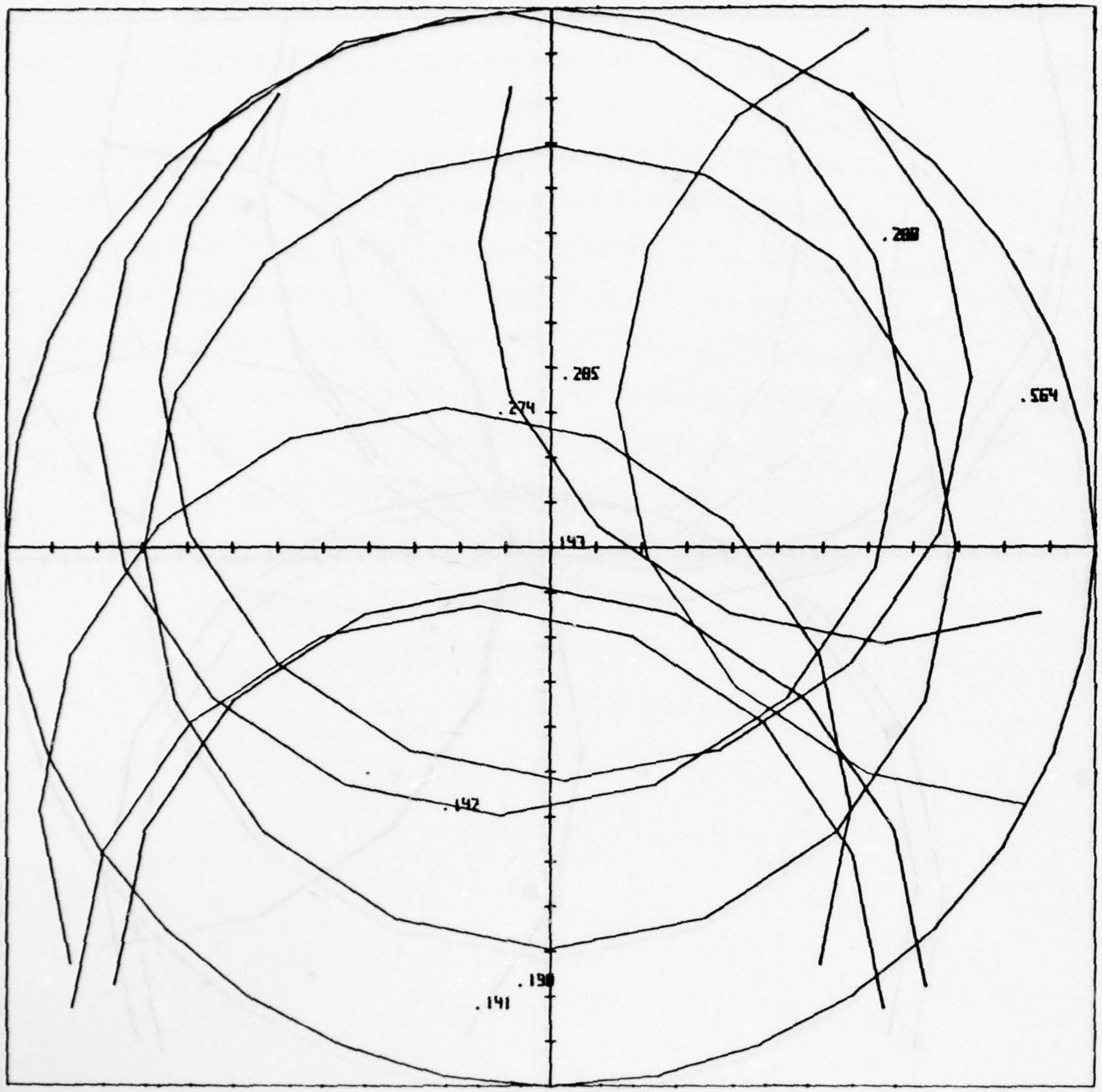
B D L

HARTFORD, CONN.
(WINDSOR LOCKS)




```
IGHT 1000    GIVES RADIUS 44.72135
ZE OF AREA (RADIUS (NM)) 60

LE # 143  USED AS NOMINAL SITE

RADAR # 139  WITHIN 48.86355161
RADAR # 140  WITHIN 48.86355161
RADAR # 141  WITHIN 51.86571278
RADAR # 142  WITHIN 31.46879664
RADAR # 143  WITHIN 0     NM
RADAR # 274  WITHIN 15.86188485
RADAR # 285  WITHIN 18.79383347
RADAR # 286  WITHIN 50.12678915
RADAR # 287  WITHIN 50.12678915
RADAR # 564  WITHIN 54.47959741
****  *****  *****  *****  *****
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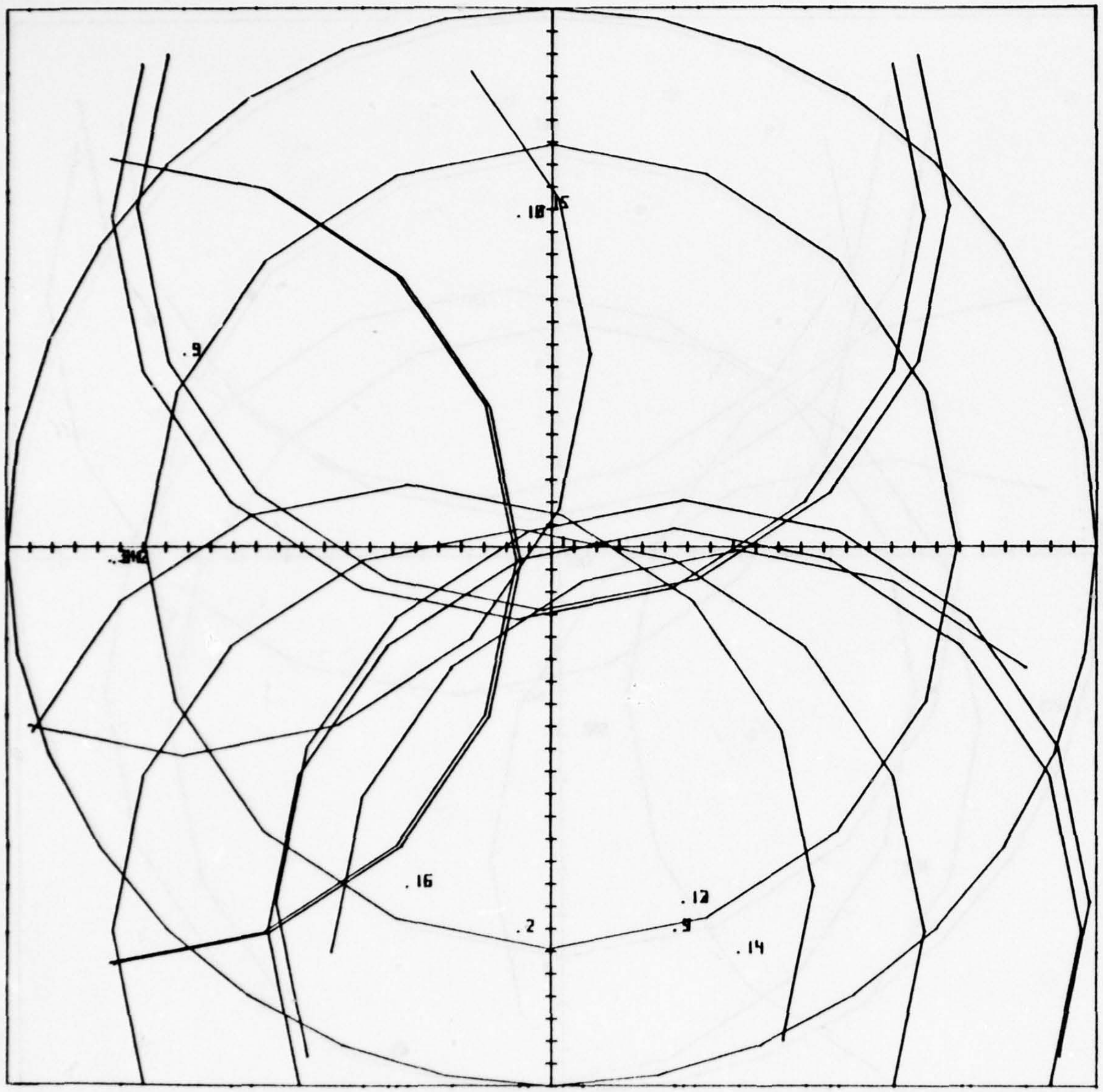


BHM

BIRMINGHAM, ALA.

HEIGHT 4000 GIVES RADIUS 89.442719
SIZE OF AREA (RADIUS (NM)) 120

FILE # 1 USED AS NOMINAL SITE

RADAR # 1	WITHIN 0	NM		
RADAR # 2	WITHIN 85.8004618			N
RADAR # 4	WITHIN 89.6656343			N
RADAR # 5	WITHIN 89.2656343			N
RADAR # 9	WITHIN 91.54446825			N
RADAR # 10	WITHIN 73.72534586			N
RADAR # 12	WITHIN 84.28491089			N
RADAR # 13	WITHIN 84.28491089			N
RADAR # 14	WITHIN 99.21132509			N
RADAR # 15	WITHIN 75.49053284			N
RADAR # 16	WITHIN 81.95169277			N
RADAR # 341	WITHIN 97.16167617			N
RADAR # 342	WITHIN 96.21372016			N
*****	*****	*****	*****	*****

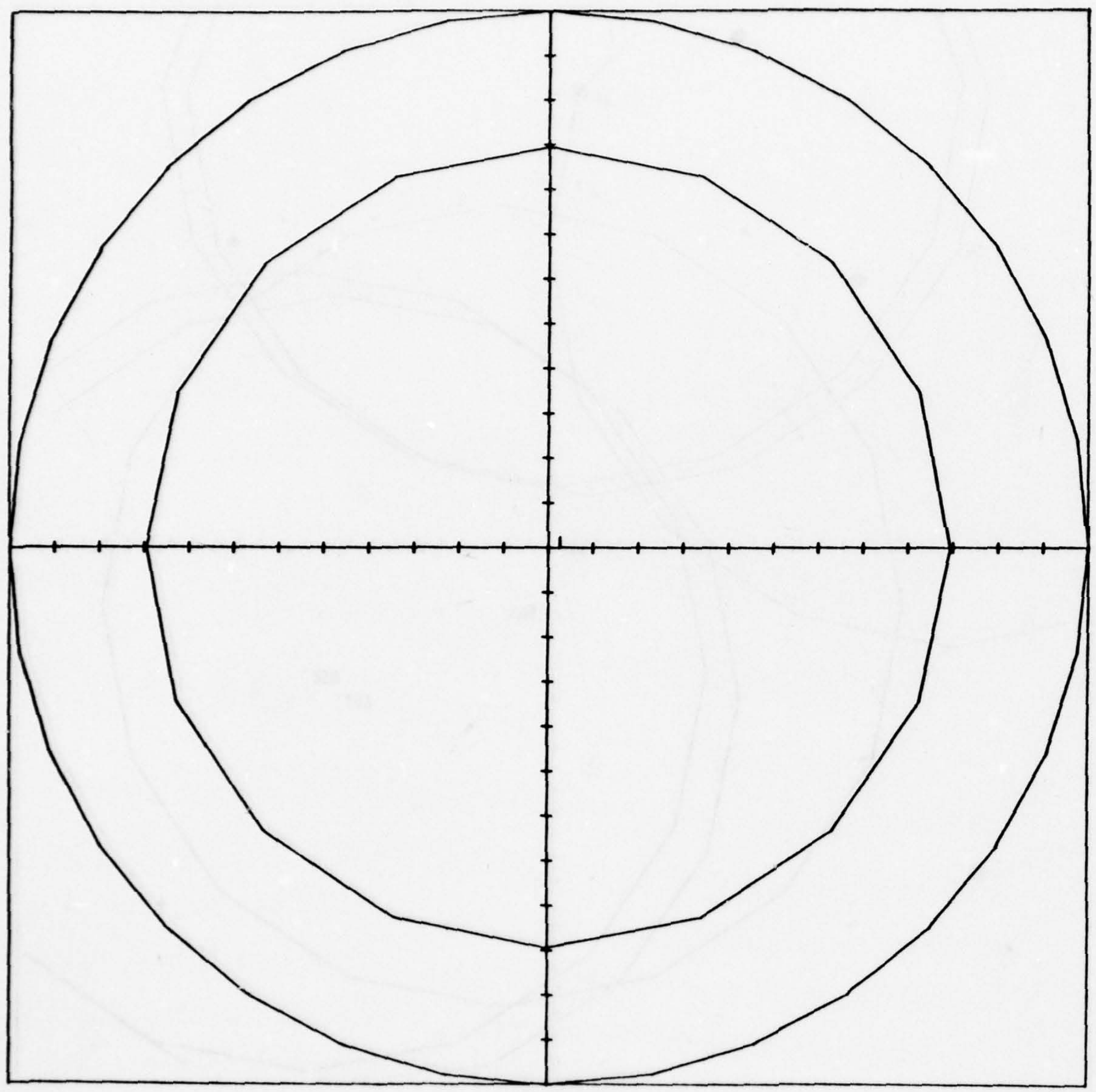
BHM

BIRMINGHAM, ALA.

HEIGHT 1 1.72135955
SIZE OF AREA RADIUS (NM) 60

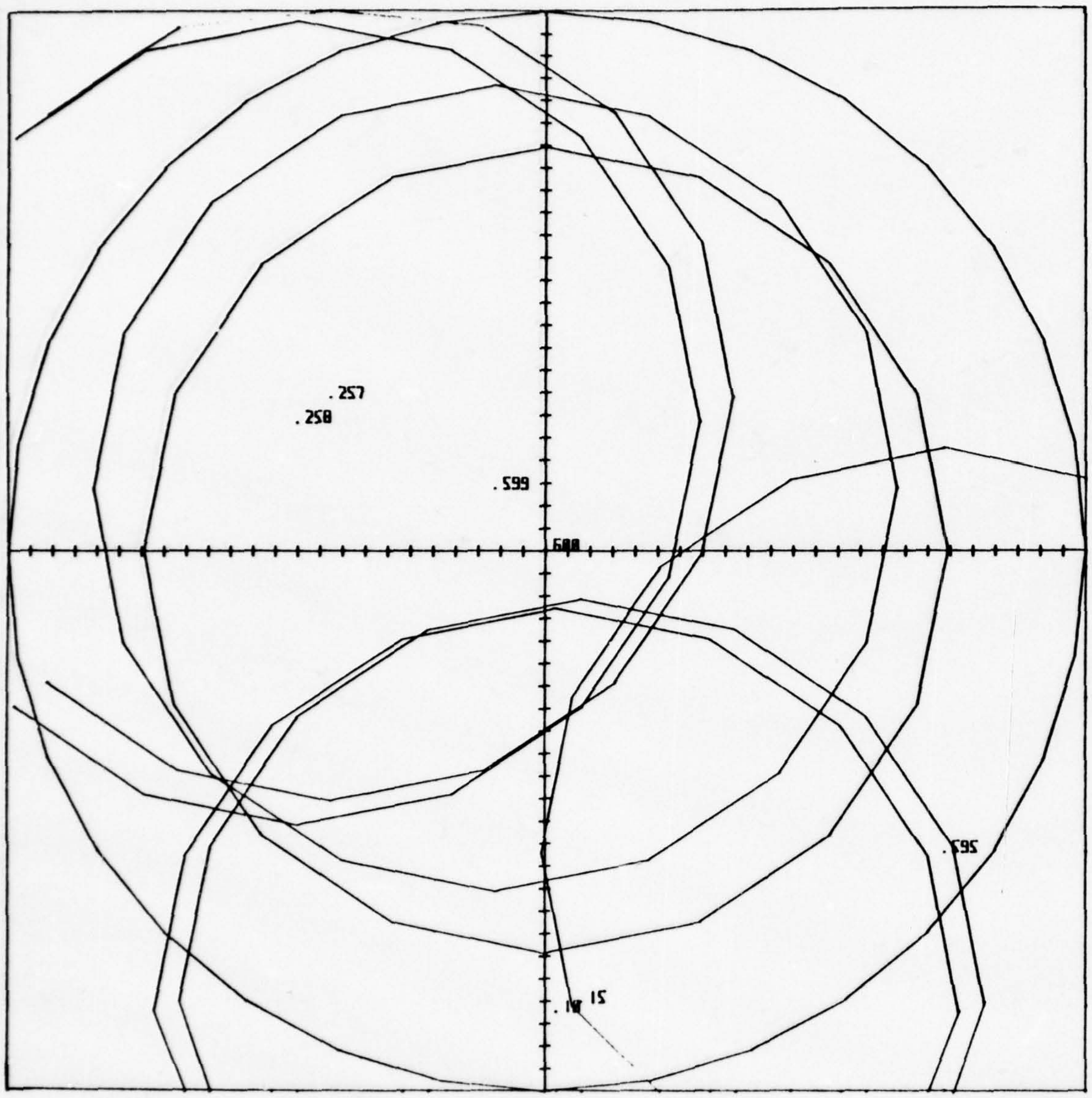
FILE # 1 USED AS NOMINAL SITE

RANGE # 1 WITHIN 0 NM
***** ***** ***** ***** *****



BNA

NASHVILLE, TENN.



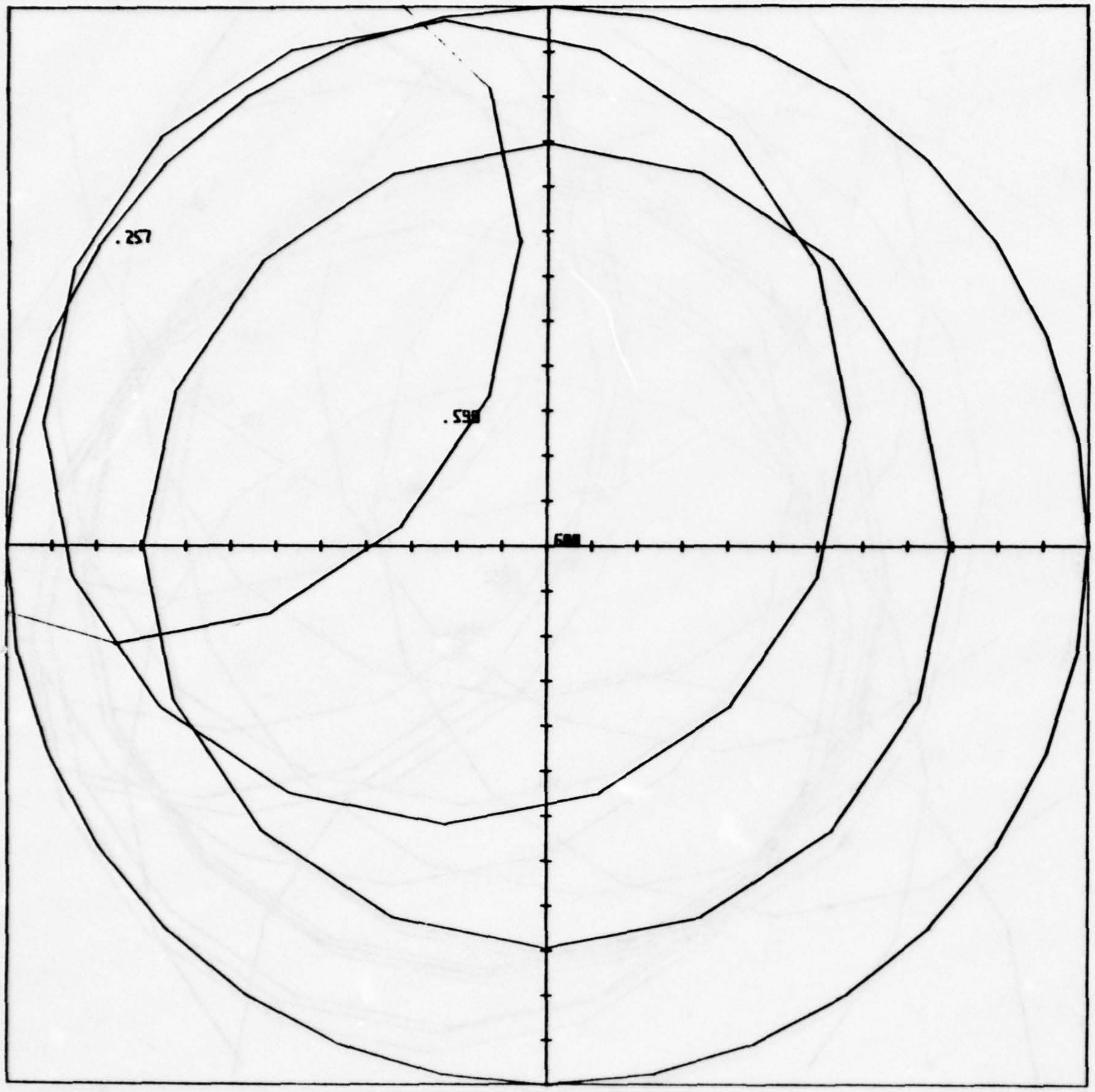

```
HEIGHT 4000    GIVES RADIUS 89.44271
SIZE OF AREA  RADIUS (NM) 120

SITE # 600  USED AS NOMINAL SITE

  RADAR # 10   WITHIN 102.3015149   |
  RADAR # 15   WITHIN 100.5185536   |
  RADAR # 257  WITHIN 58.5188308    |
  RADAR # 258  WITHIN 62.0271512 4  |
  RADAR # 595  WITHIN 111.1190145   |
  RADAR # 599  WITHIN 17.78574000   |
  RADAR # 600  WITHIN 0    NM
*****  *****  *****  *****  *****
```

B N A

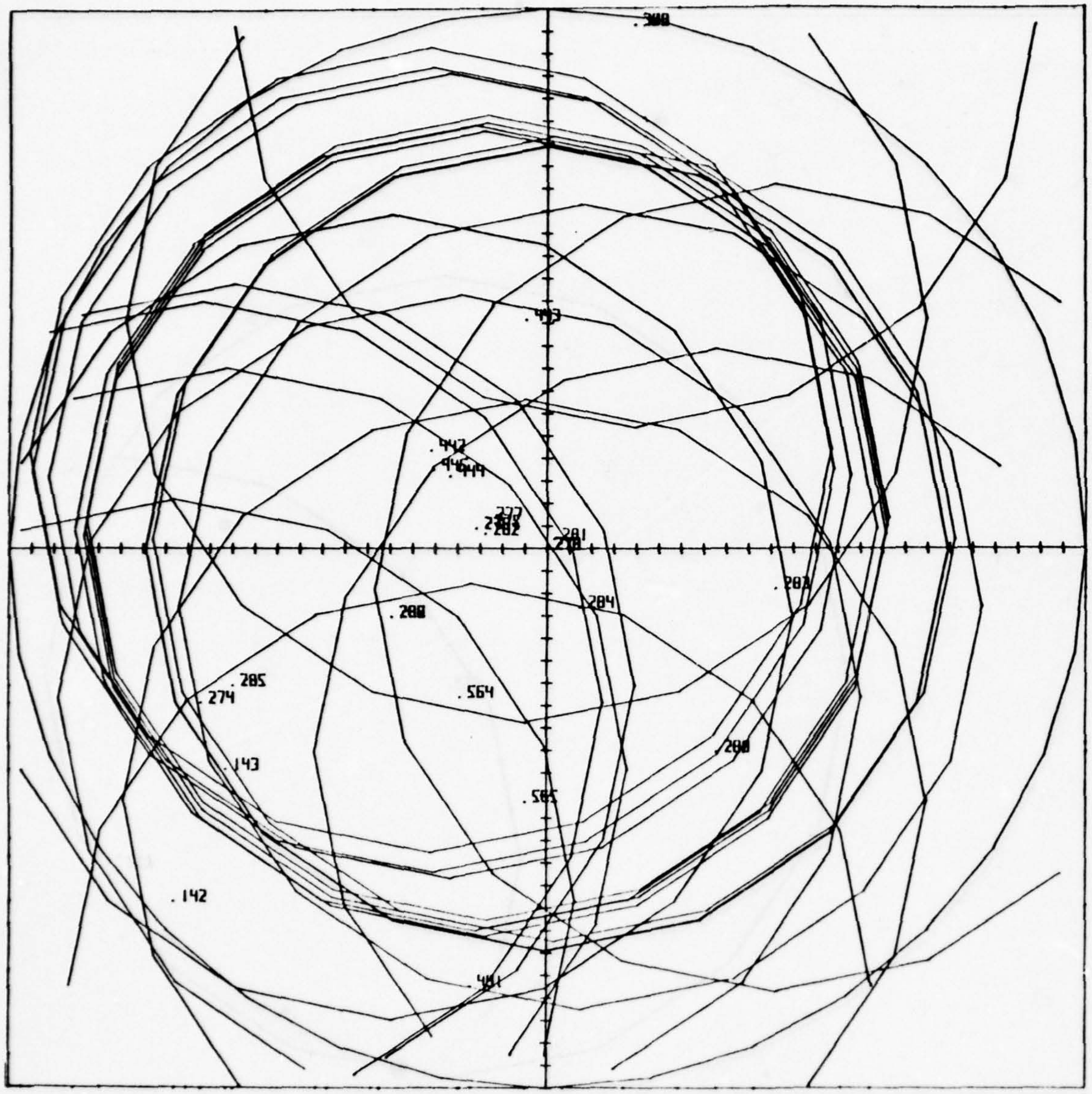
NASHVILLE, TENN.



IGHT 1000 GIVES RADIUS 44.7213
ZE OF AREA RADIUS (NM) 60

ILE # 600 USED AS NOMINAL SITE

RADAR # 257 WITHIN 58.5188308
RADAR # 599 WITHIN 17.78574000
RADAR # 600 WITHIN 0 NM
*** ***** ***** ***** *****



B O S

BOSTON, MASS.

HEIGHT 4000 GIVES RADIUS 89.44271910
SIZE OF AREA (RADIUS (NM)) 120

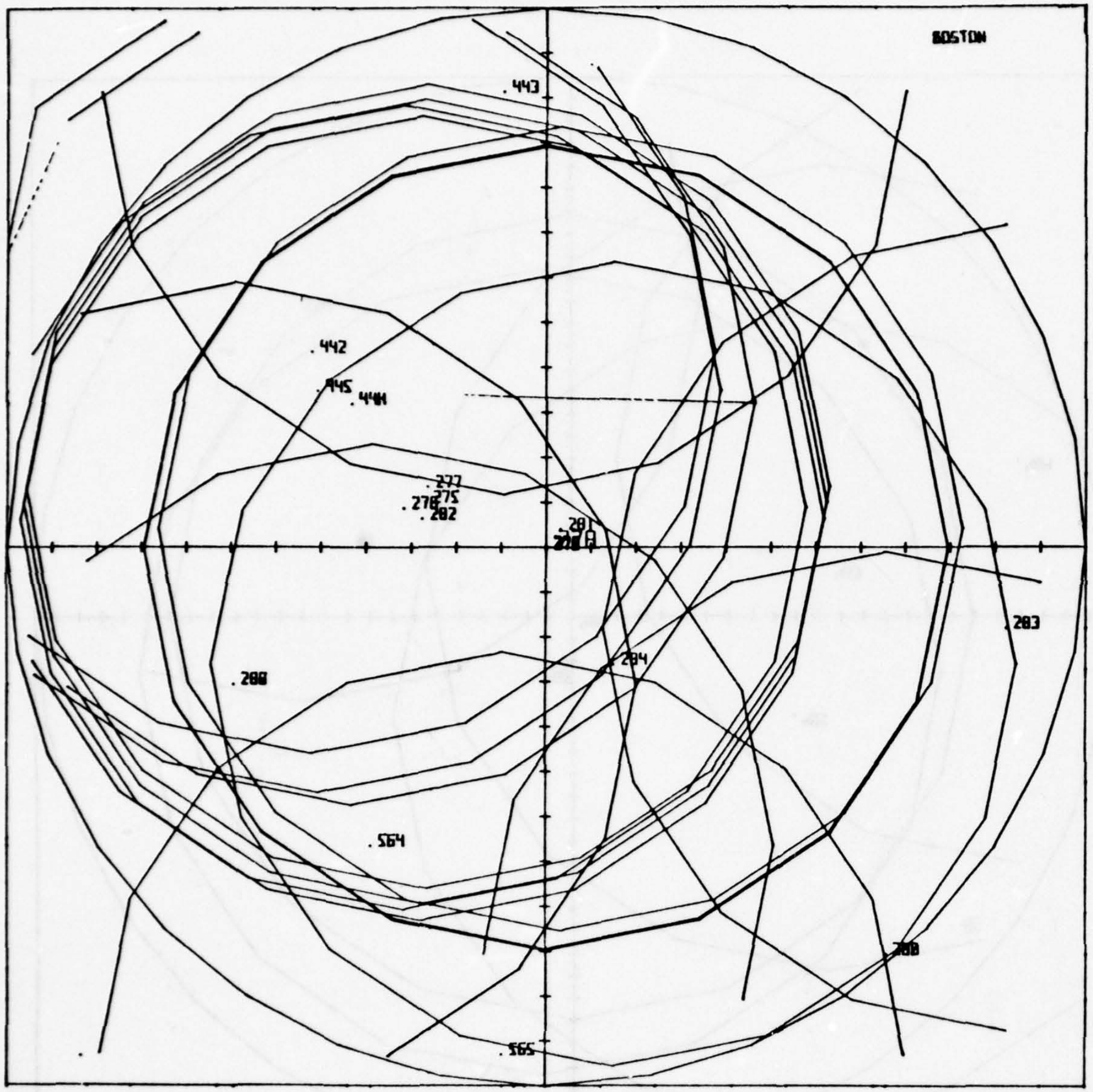
FILE # 278 USED AS NOMINAL SITE

RADAR	# 142	WITHIN	114.3513762	N
RADAR	# 143	WITHIN	86.83745732	N
RADAR	# 274	WITHIN	84.34349134	N
*RADAR	# 275	WITHIN	14.39867358	N
RADAR	# 276	WITHIN	16.42902560	N
RADAR	# 277	WITHIN	14.80640941	N
RADAR	# 278	WITHIN	0	NM
RADAR	# 279	WITHIN	0.19214113	N
RADAR	# 280	WITHIN	58.98630561	N
RADAR	# 281	WITHIN	2.60163327	N
RADAR	# 282	WITHIN	14.16289717	N
RADAR	# 283	WITHIN	51.92850623	N
RADAR	# 284	WITHIN	15.10300297	N
RADAR	# 285	WITHIN	76.26150438	N
RADAR	# 286	WITHIN	37.87041717	N
RADAR	# 287	WITHIN	37.87041717	N
RADAR	# 309	WITHIN	117.912934	N
RADAR	# 442	WITHIN	33.80030599	N
RADAR	# 443	WITHIN	50.82539626	N
RADAR	# 444	WITHIN	26.83540177	N
RADAR	# 445	WITHIN	30.6714132	N
RADAR	# 491	WITHIN	98.95344798	N
RADAR	# 564	WITHIN	38.48[illegible]774	N
RADAR	# 565	WITHIN	56.67152692	NM

***** ***** ***** ***** *****

BOS

BOSTON, MASS.

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DEIG                                  72135955
SIZE OF AREA (RADIUS (NM)) 60

FILE # 278  USED AS NOMINAL SITE

  FRAME # 275  WITHIN 14.39867958   NM
  FRAME # 276  WITHIN 16.42922560   NM
  FRAME # 277  WITHIN 14.80646941   NM
  FRAME # 278  WITHIN 0    NM
  FRAME # 279  WITHIN 0.192142113   NM
  FRAME # 280  WITHIN 58.98638561   NM
  FRAME # 281  WITHIN 2.601636327   NM
  FRAME # 282  WITHIN 14.16239717   NM
  FRAME # 283  WITHIN 51.93850623   NM
  FRAME # 284  WITHIN 15.10300297   NM
  FRAME # 286  WITHIN 37.87041717   NM
  FRAME # 287  WITHIN 37.87041717   NM
  FRAME # 442  WITHIN 33.00030599   NM
  FRAME # 443  WITHIN 50.02539676   NM
  FRAME # 444  WITHIN 26.83540177   NM
  FRAME # 445  WITHIN 30.6714132    NM
  FRAME # 564  WITHIN 38.48982774   NM
  FRAME # 565  WITHIN 56.[illegible]   NM
*****
```
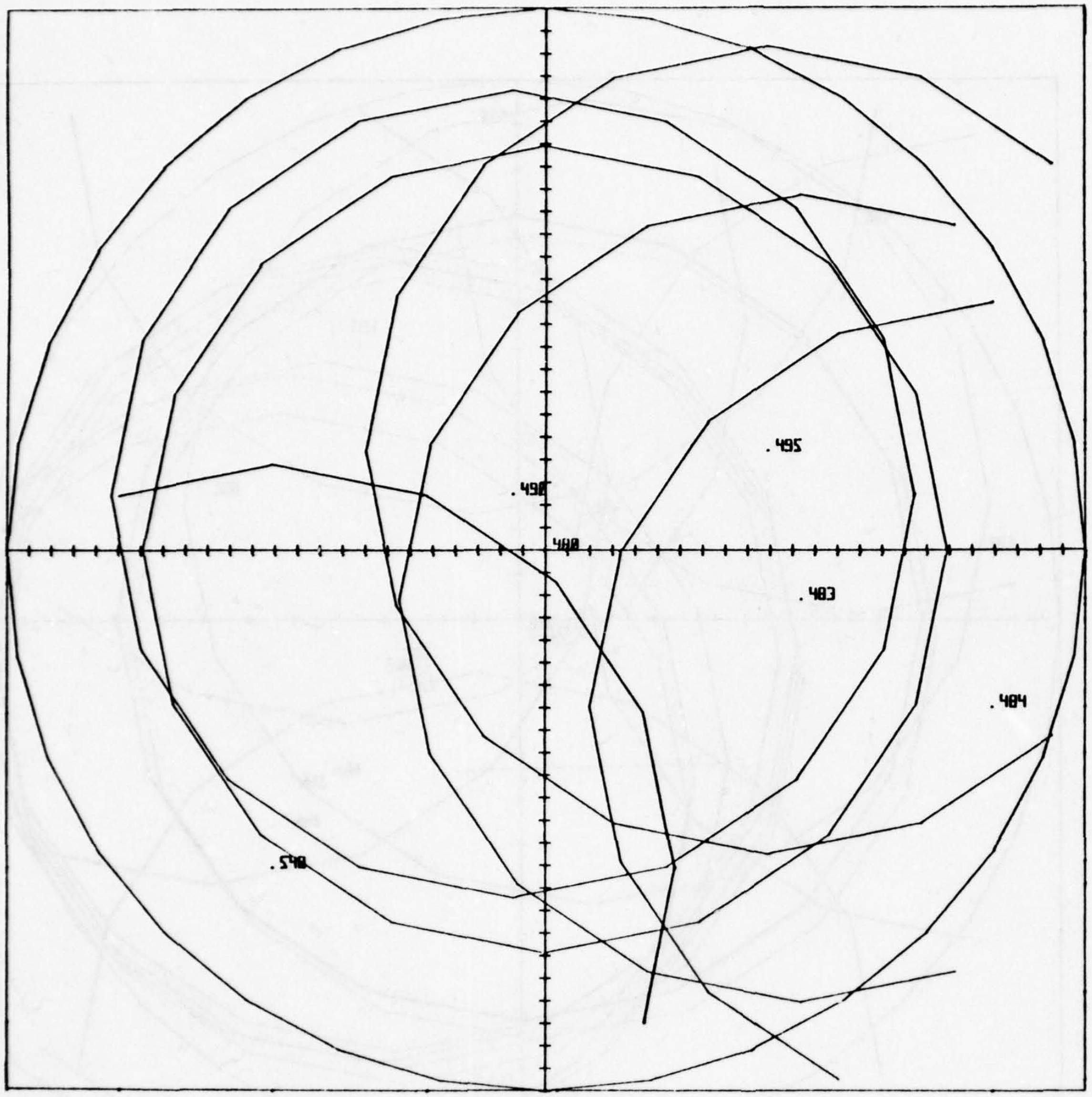

BUF

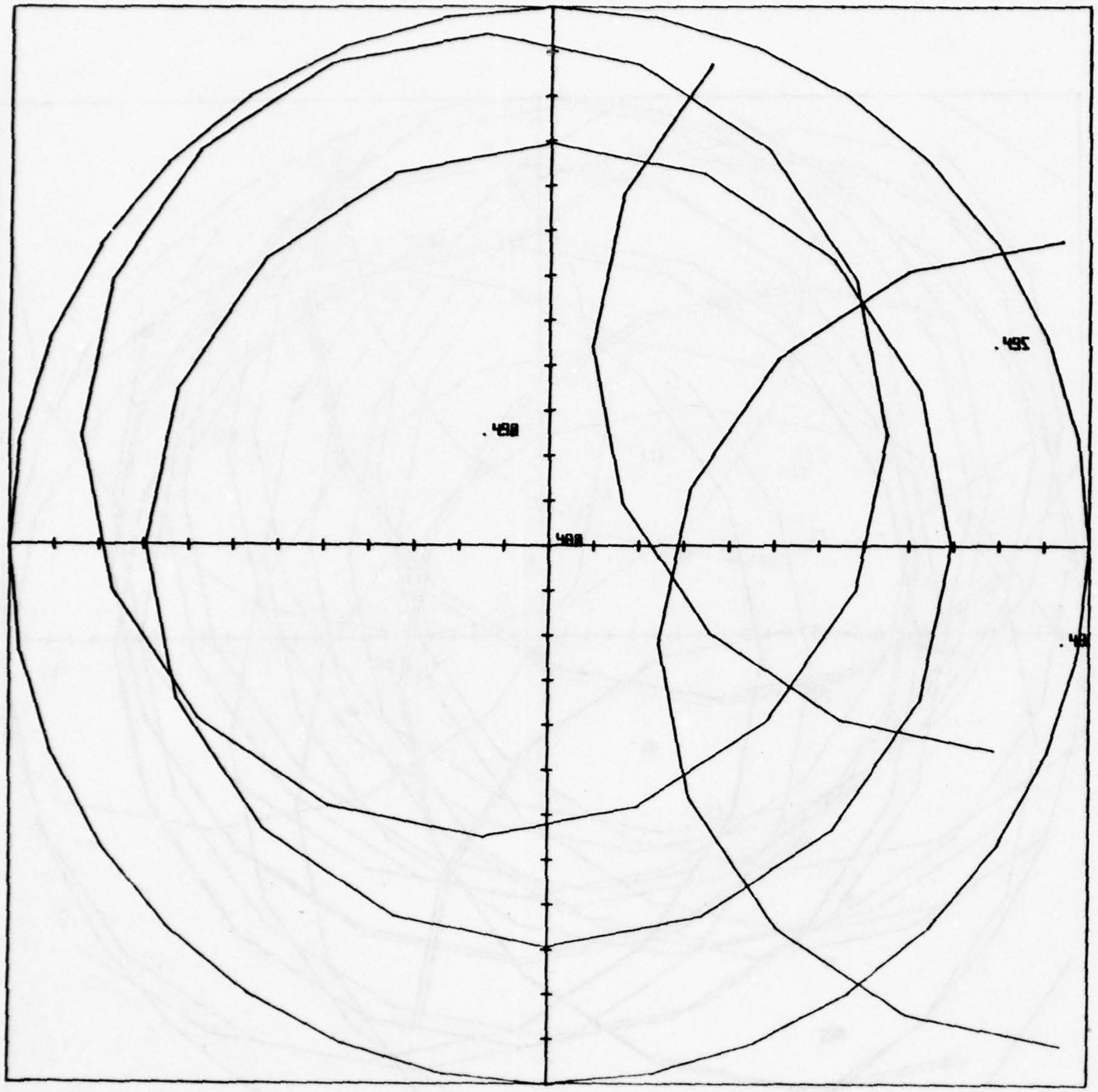
BUFFALO, N. Y.




```
EIGHT 4000     GIVES RADIUS 89.44271
IZE OF AREA (RADIUS (NM)) 120

ILE # 480  USED AS NOMINAL SITE

 RADAR # 480  WITHIN 0      NM
 RADAR # 483  WITHIN 50.01119222
 RADAR # 484  WITHIN 105.4000631
 RADAR # 490  WITHIN 14.20076003
 RADAR # 495  WITHIN 54.15740715
 RADAR # 547  WITHIN 93.06124684
 RADAR # 548  WITHIN 93.06124684
****  *****  *****  *****  *****
```

BUF

BUFFALO, N. Y.



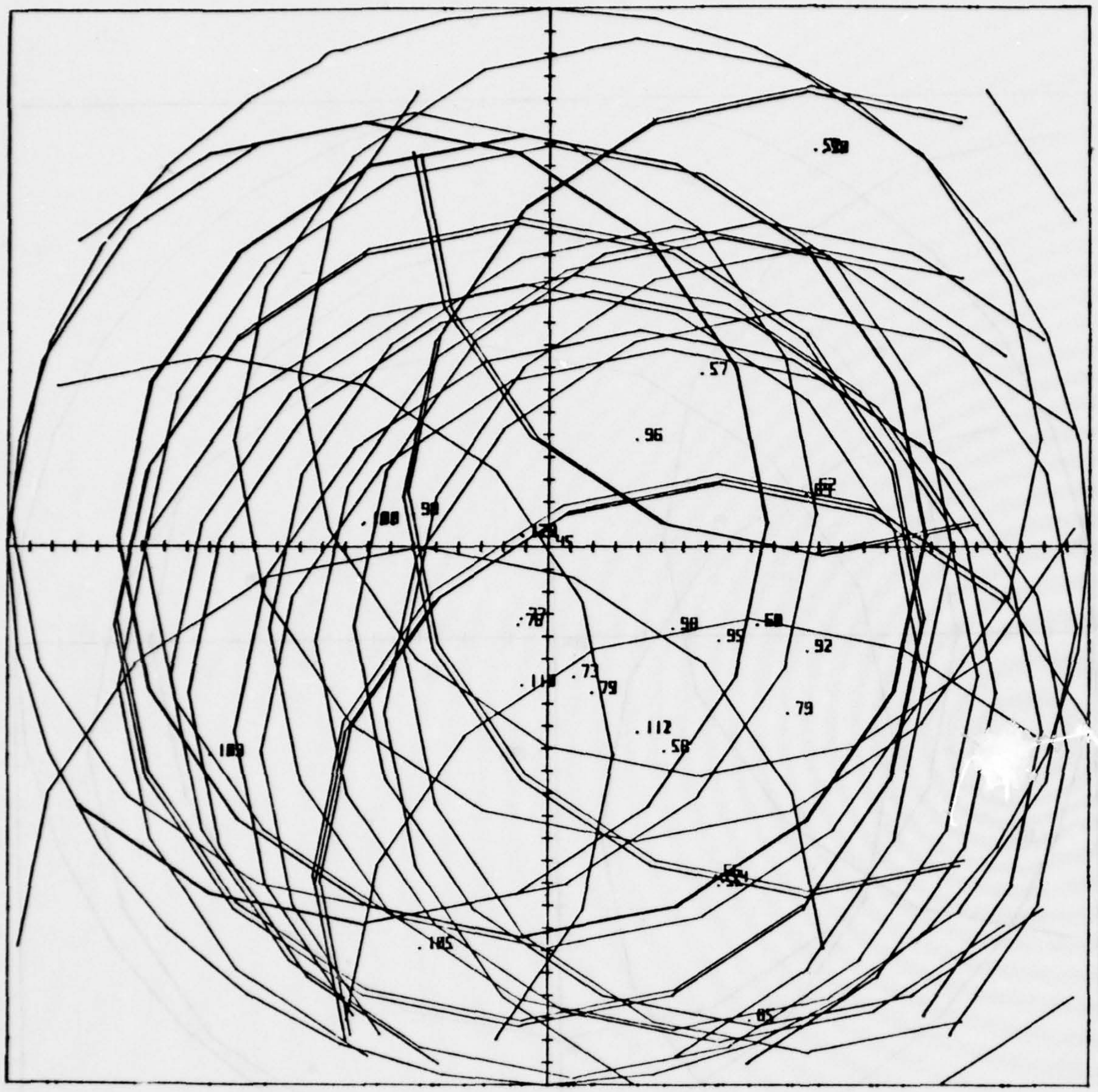
HEIGHT 72135955
SIZE OF AREA RADIUS [illegible]

FILE # 480 USED AS NOMINAL SITE

RADAR # 480 WITHIN 0 NM
RADAR # 483 WITHIN 58.01119222 NM
RADAR # 490 WITHIN 14.20076003 NM
FU NM

BUR

BURBANK, CALIF.

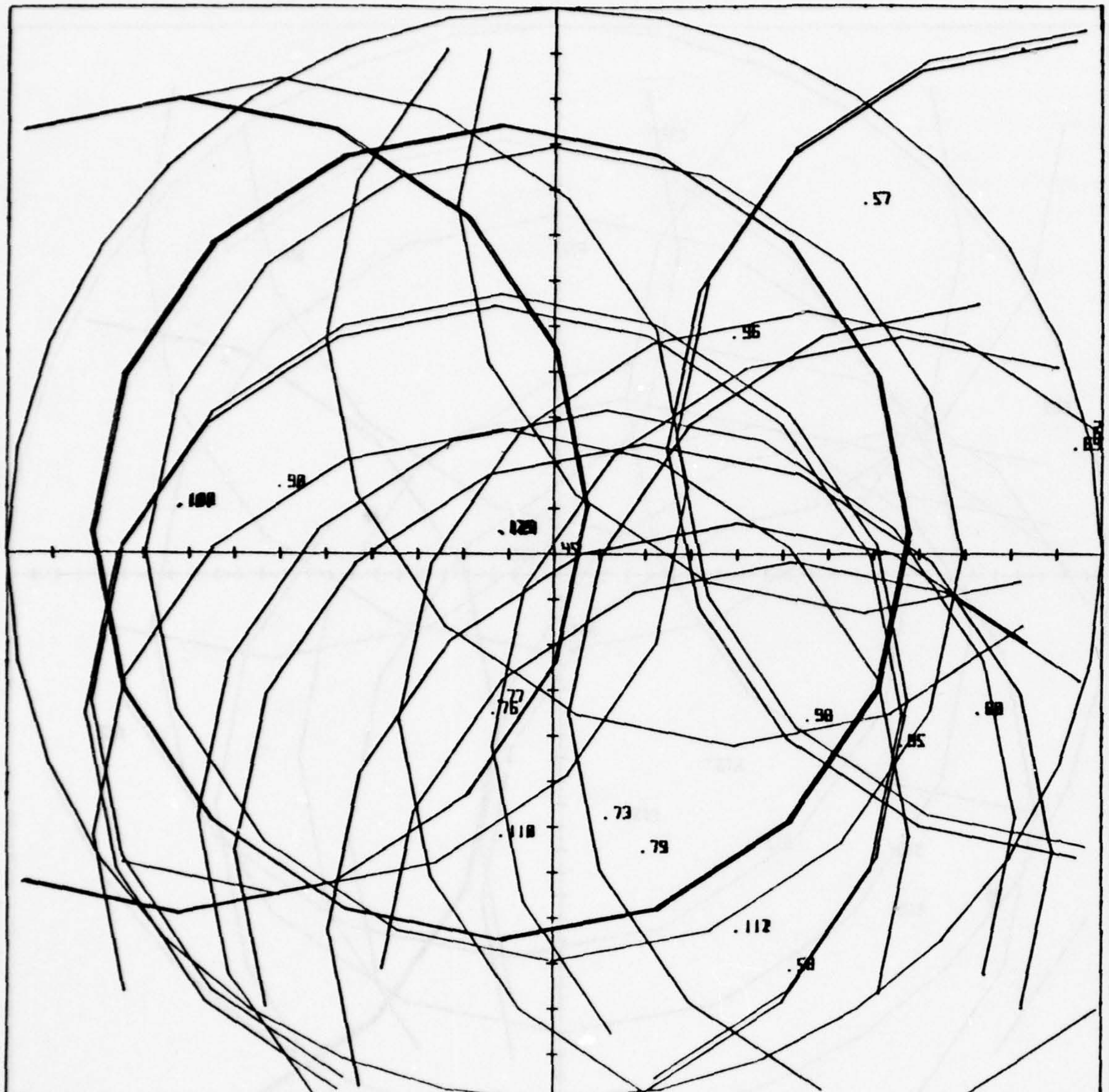


HEIGHT 4000 GIVES RADIUS 89.44271910
SIZE OF AREA (RADIUS (NM)) 120

FILE # 45 USED AS NOMINAL SITE

RADAR #	45	WITHIN	0	NM
RADAR #	50	WITHIN	106.6080172	NM
RADAR #	51	WITHIN	106.0166027	NM
RADAR #	52	WITHIN	106.0166027	NM
RADAR #	54	WITHIN	84.26019431	NM
RADAR #	55	WITHIN	84.52916676	NM
RADAR #	56	WITHIN	82.36785758	NM
RADAR #	57	WITHIN	51.1815669	NM
RADAR #	58	WITHIN	52.42274847	NM
RADAR #	59	WITHIN	49.60826838	NM
RADAR #	60	WITHIN	49.60826838	NM
RADAR #	62	WITHIN	59.53358502	NM
RADAR #	63	WITHIN	58.29899505	NM
RADAR #	64	WITHIN	58.29899505	NM
RADAR #	73	WITHIN	29.5420682	NM
RADAR #	74	WITHIN	34.10570922	NM
RADAR #	75	WITHIN	34.10570922	NM
RADAR #	76	WITHIN	18.69766862	NM
RADAR #	77	WITHIN	17.25077250	NM
RADAR #	79	WITHIN	64.88421[illegible]	NM
RADAR #	85	WITHIN	114.6227882	NM
RADAR #	90	WITHIN	30.93806588	NM
RADAR #	92	WITHIN	62.0938903	NM
RADAR #	95	WITHIN	43.45127468	NM
RADAR #	96	WITHIN	30.84498063	NM
RADAR #	98	WITHIN	33.27317813	NM
RADAR #	100	WITHIN	41.21447458	NM
RADAR #	101	WITHIN	41.43520386	NM
RADAR #	105	WITHIN	93.90128396	NM
RADAR #	109	WITHIN	80.1272552	NM
RADAR #	110	WITHIN	31.53340343	NM
RADAR #	111	WITHIN	45.94615406	NM
RADAR #	112	WITHIN	45.94615406	NM
RADAR #	123	WITHIN	6.21304723	NM
RADAR #	124	WITHIN	6.01502[illegible]	NM
RADAR #	125	WITHIN	6.43784448	NM

..... ***** ***** ***** *****



BUR

BURBANK, CALIF.

[illegible] 35955
SIZE OF AREA (RADIUS (NM)) 60

FILE # 45 USED AS NOMINAL SITE

RADAR #	45	WITHIN	0	NM
RADAR #	57	WITHIN	51.1815669	NM
RADAR #	58	WITHIN	52.42274847	NM
RADAR #	59	WITHIN	49.668[illegible]858	NM
RADAR #	60	WITHIN	49.6828838	NM
RADAR #	62	WITHIN	59.53358502	NM
RADAR #	63	WITHIN	58.2[illegible]099505	NM
RADAR #	64	WITHIN	58.2[illegible]99505	NM
RADAR #	73	WITHIN	29.5420682	NM
RADAR #	74	WITHIN	34.10570922	NM
RADAR #	75	WITHIN	34.10570922	NM
RADAR #	76	WITHIN	18.69766862	NM
RADAR #	77	WITHIN	17.2507725[illegible]	NM
RADAR #	90	WITHIN	30.93806588	NM
RADAR #	95	WITHIN	43.45127468	NM
RADAR #	96	WITHIN	30.84498063	NM
RADAR #	98	WITHIN	33.27317813	NM
RADAR #	100	WITHIN	41.21447456	NM
RADAR #	101	WITHIN	41.4[illegible]52038[illegible]	NM
RADAR #	110	WITHIN	[illegible]1.53340443	NM
RADAR #	111	WITHIN	[illegible].94615406	NM
RADAR #	112	WITHIN	45.94615406	NM
RADAR #	12[illegible]	WITHIN	[illegible].13094[illegible]23	NM
RADAR #	124	WITHIN	[illegible].01502926[illegible]	NM
RADAR #	125	WITHIN	[illegible]	NM

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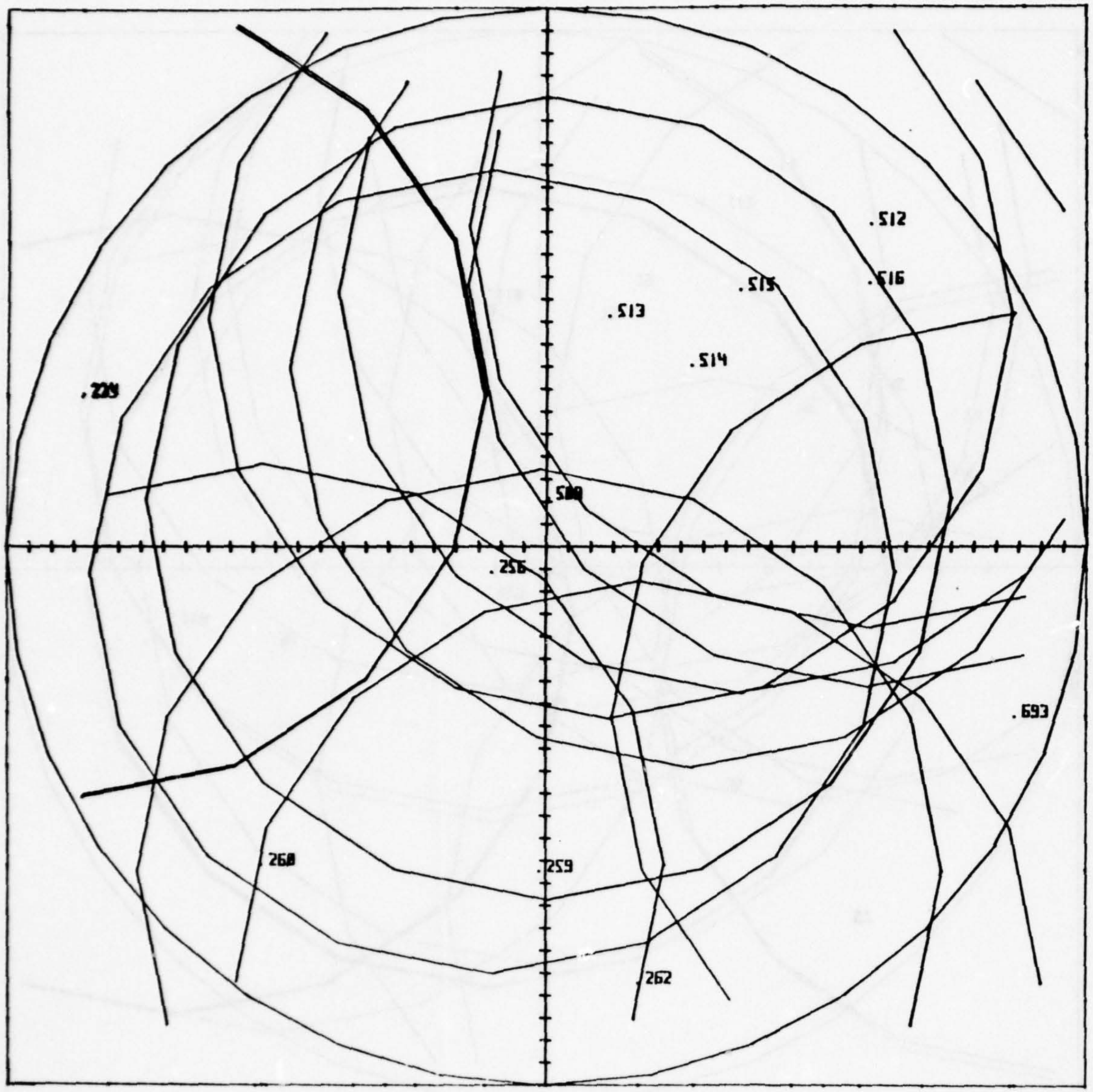
C I N

CINCINNATTI, OHIO




```
.IGHT 4000     GIVES RADIUS 89.44271
.ZE OF AREA (RADIUS (NM)) 120

EIGHT 4000     GIVES RADIUS 89.44271
IZE OF AREA (RADIUS (NM)) 120

ILE NAME=CINUSED AS NOMINAL SITE

 RADAR # 233  WITHIN 108.5710775   NM
 RADAR # 234  WITHIN 108.3604439   NM
 RADAR # 256  WITHIN 13.1751254    NM
 RADAR # 259  WITHIN 72.3243096    NM
 RADAR # 260  WITHIN 95.01649638   NM
 RADAR # 262  WITHIN 99.26288774   NM
 RADAR # 508  WITHIN 10.78124593
 RADAR # 509  WITHIN 10.78124593
 RADAR # 512  WITHIN 101.5899753
 RADAR # 513  WITHIN 53.15626023
 RADAR # 514  WITHIN 51.61166041
 RADAR # 515  WITHIN 71.4583504
 RADAR # 516  WITHIN 92.60376585
 RADAR # 693  WITHIN 110.7974393
 ***  *****  *****  ****  *****
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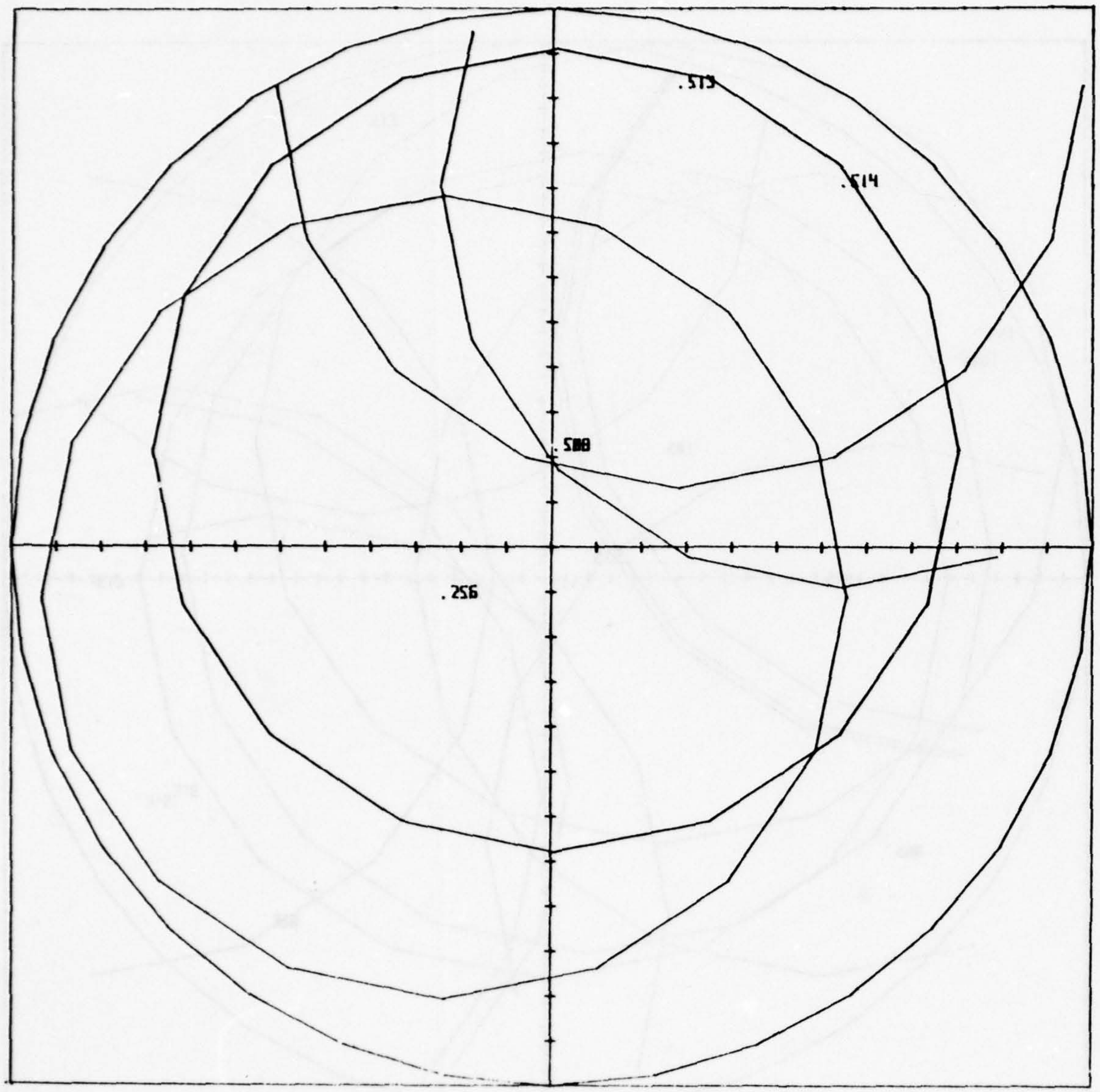
C I N

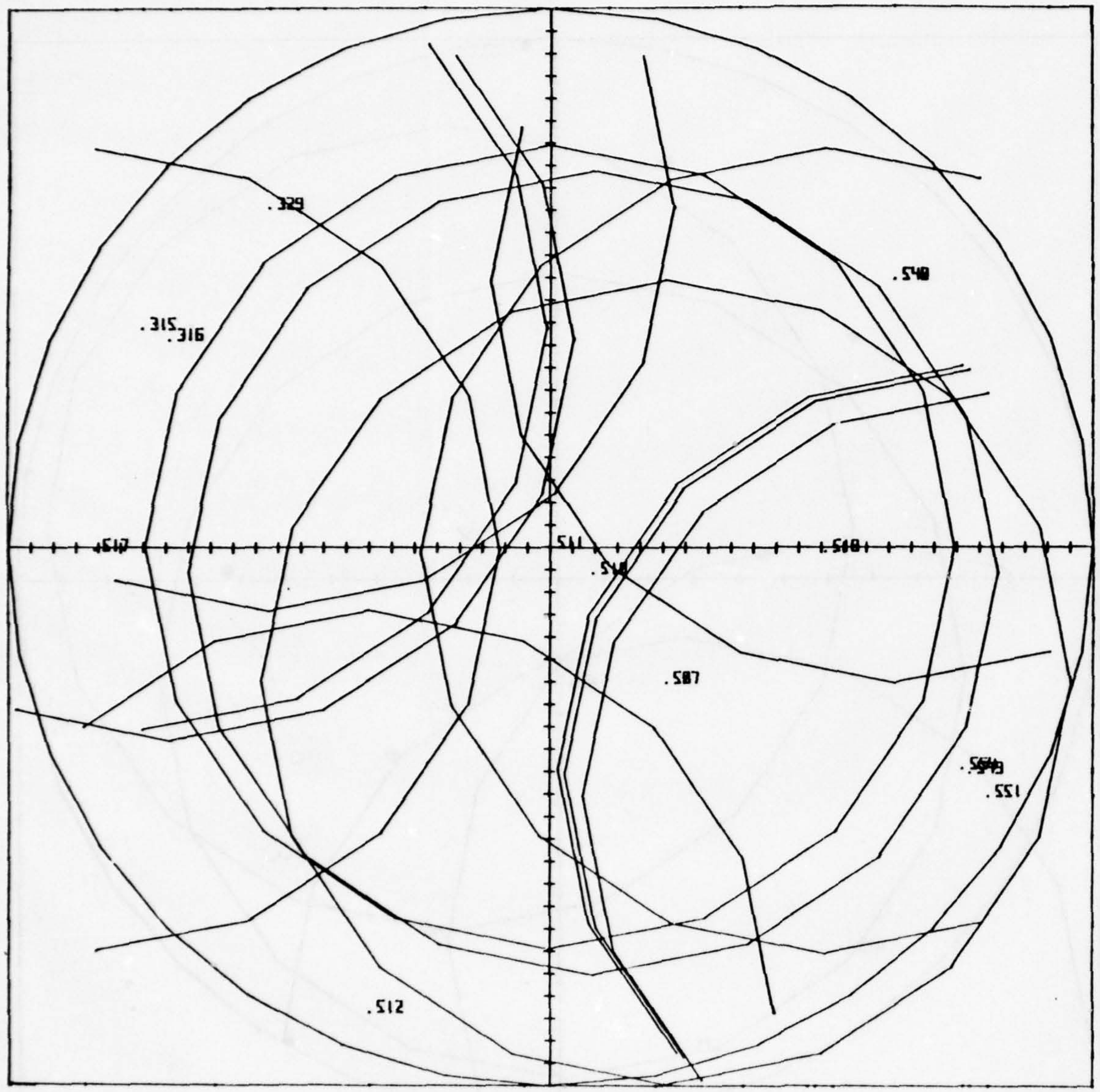
CINCINNATI, OHIO



GNT 1000   GIVES RADIUS 44.721359
E OF AREA RADIUS (NM) 60

E NAME=CINUSED AS NOMINAL SITE

RADAR # 256 WITHIN 13.17511.54
RADAR # 508 WITHIN 10.78124543 NM
RADAR # 509 WITHIN 10.78124543 NM
RADAR # 513 WITHIN 53.15626823
RADAR # 514 WITHIN 51.61166641
*** ***** ***** ***** *****



CLE

CLEVELAND, OHIO

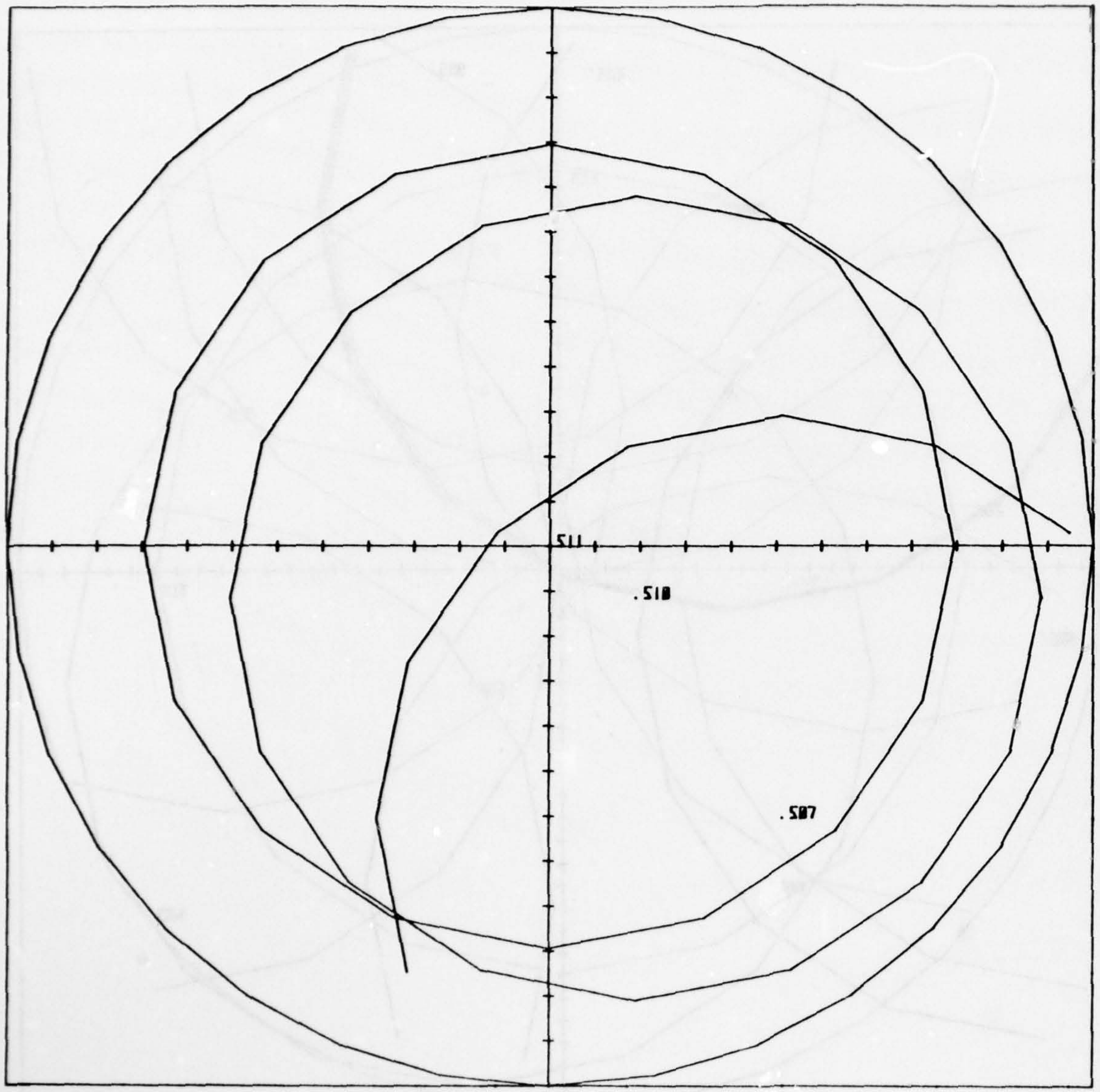
HEIGHT 4000 GIVES RADIUS 89.442719
SIZE OF AREA (RADIUS (NM)) 120

SITE # 511 USED AS NOMINAL SITE

RADAR # 315 WITHIN 102.436761 NM
RADAR # 316 WITHIN 96.00633251 NM
RADAR # 329 WITHIN 97.49630087 NM
RADAR # 507 WITHIN 39.68410496 NM
RADAR # 510 WITHIN 11.18438033 NM
RADAR # 511 WITHIN 0 NM
RADAR # 512 WITHIN 111.0306738 NM
RADAR # 517 WITHIN 100.614267 NM
RADAR # 518 WITHIN 60.8827064 NM
RADAR # 547 WITHIN 96.59530975 NM
RADAR # 548 WITHIN 96.59530975 NM
RADAR # 549 WITHIN 105.615424 NM
RADAR # 551 WITHIN 111.6317504 NM
RADAR # 554 WITHIN 103.8112408 NM
***** ***** ***** ***** *****

C L E

CLEVELAND, OHIO



HEIGHT .35955

SIZE OF AREA RADIUS (NM) 60

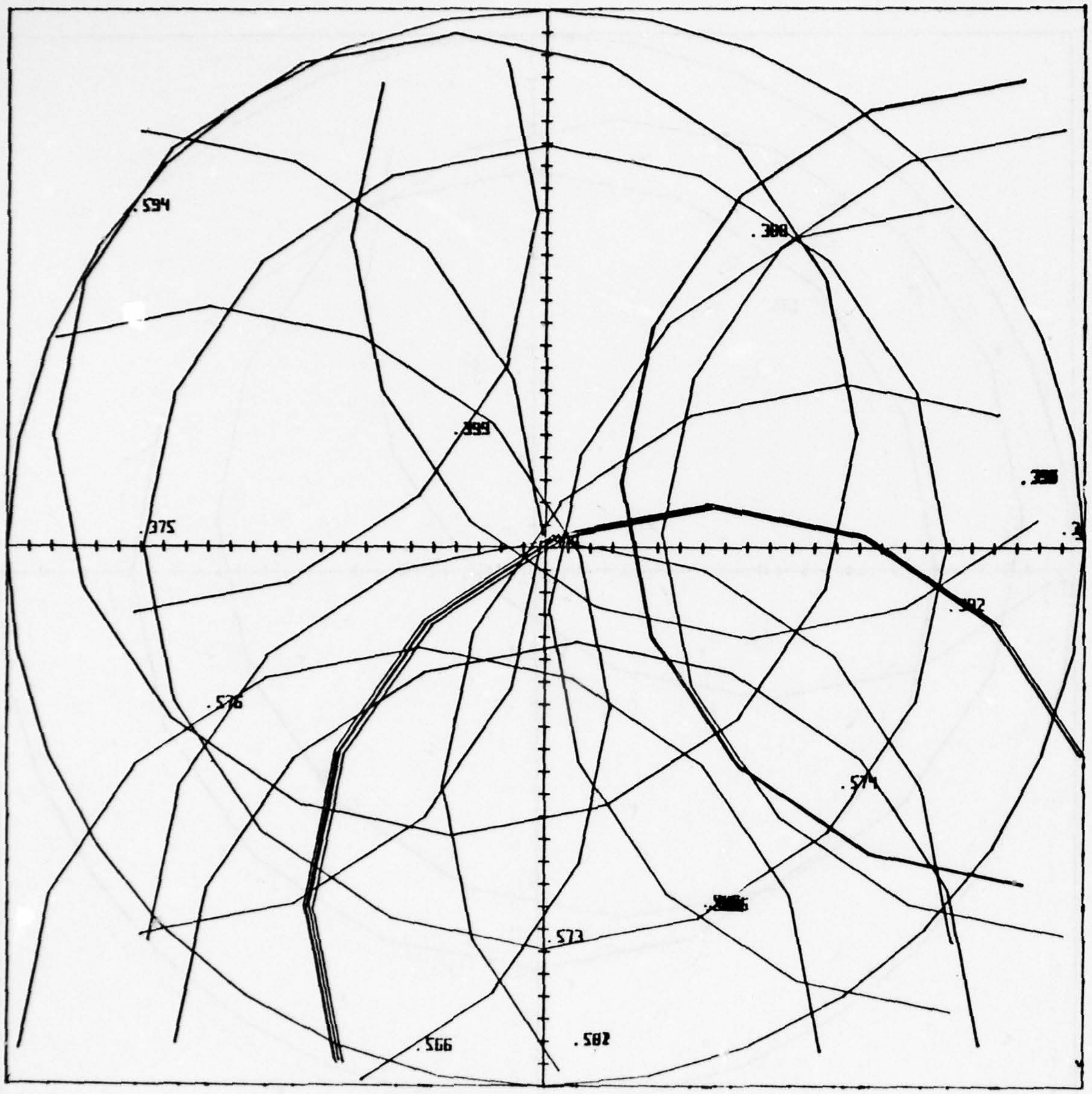
FILE # 511 USED AS NOMINAL SITE

RADAR # 507 WITHIN 39.88410496 NM
RADAR # 510 WITHIN 11.18438033 NM
RADAR # 511 WITHIN 0 NM

***** ***** ***** ***** *****

CLT

CHARLOTTE, N. C.



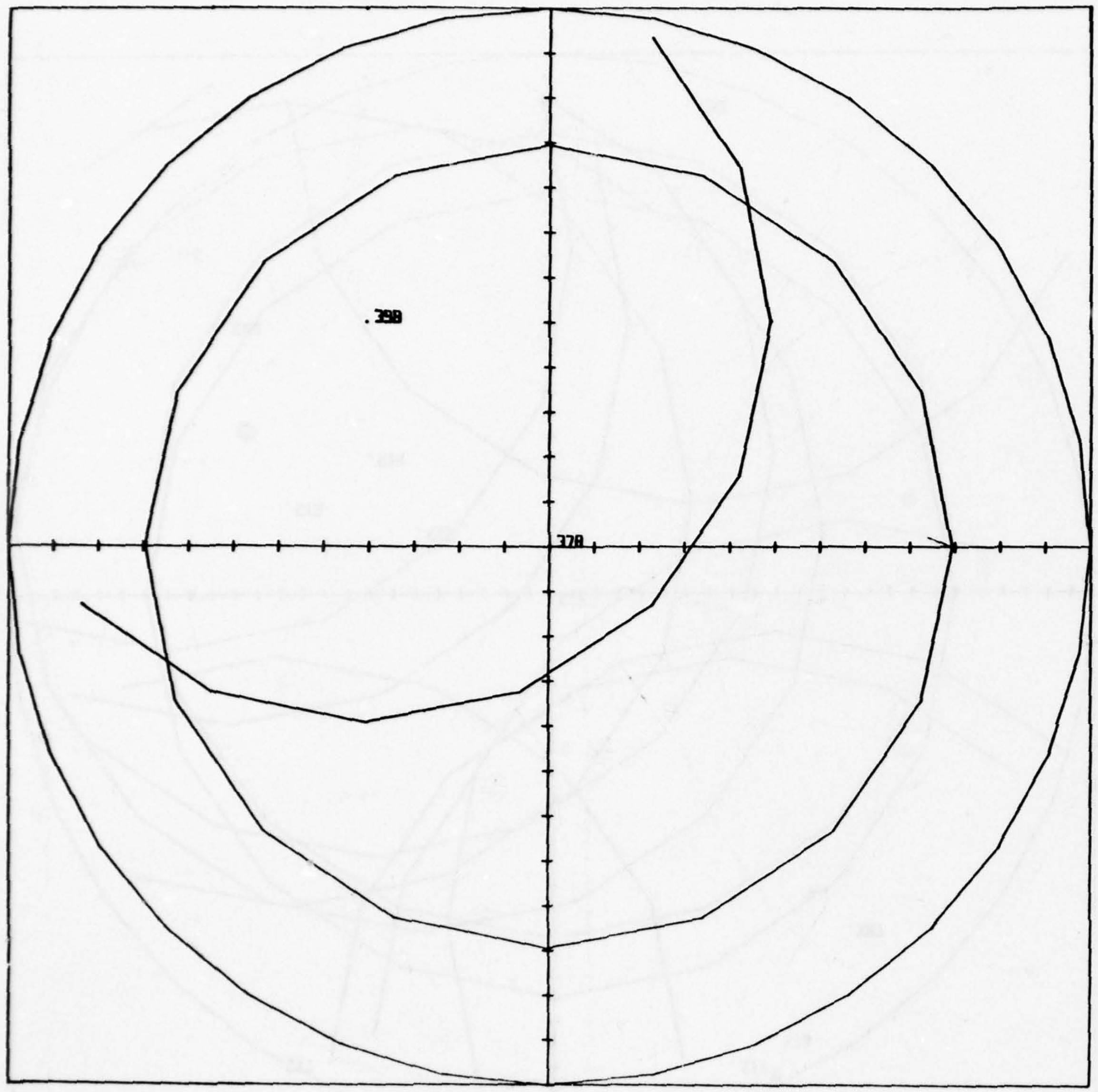

```
HEIGHT 4000    GIVES RADIUS 89.44271
 IZE OF AREA (RADIUS (NM)) 120

FILE # 378  USED AS NOMINAL SITE

  RADAR # 375  WITHIN 90.05010131
  RADAR # 378  WITHIN 0    NM
  RADAR # 385  WITHIN 115.4820452
  RADAR # 388  WITHIN 83.10625269
  RADAR # 392  WITHIN 91.50268425
  RADAR # 393  WITHIN 32.21638569
  RADAR # 394  WITHIN 32.21638569
  RADAR # 395  WITHIN 107.2670963
  RADAR # 396  WITHIN 107.5845549
  RADAR # 397  WITHIN 107.2670963
  RADAR # 566  WITHIN 115.4315424
  RADAR # 573  WITHIN 87.78761405
  RADAR # 574  WITHIN 85.33905004
  RADAR # 576  WITHIN 83.05605006
  RADAR # 581  WITHIN 110.8764183
  RADAR # 582  WITHIN 110.8764183
  RADAR # 583  WITHIN 88.2045644
  RADAR # 584  WITHIN 88.52880219
  RADAR # 585  WITHIN 87.57284753
  RADAR # 586  WITHIN 89.17670793
  RADAR # 594  WITHIN 118.0240852
```

CLT

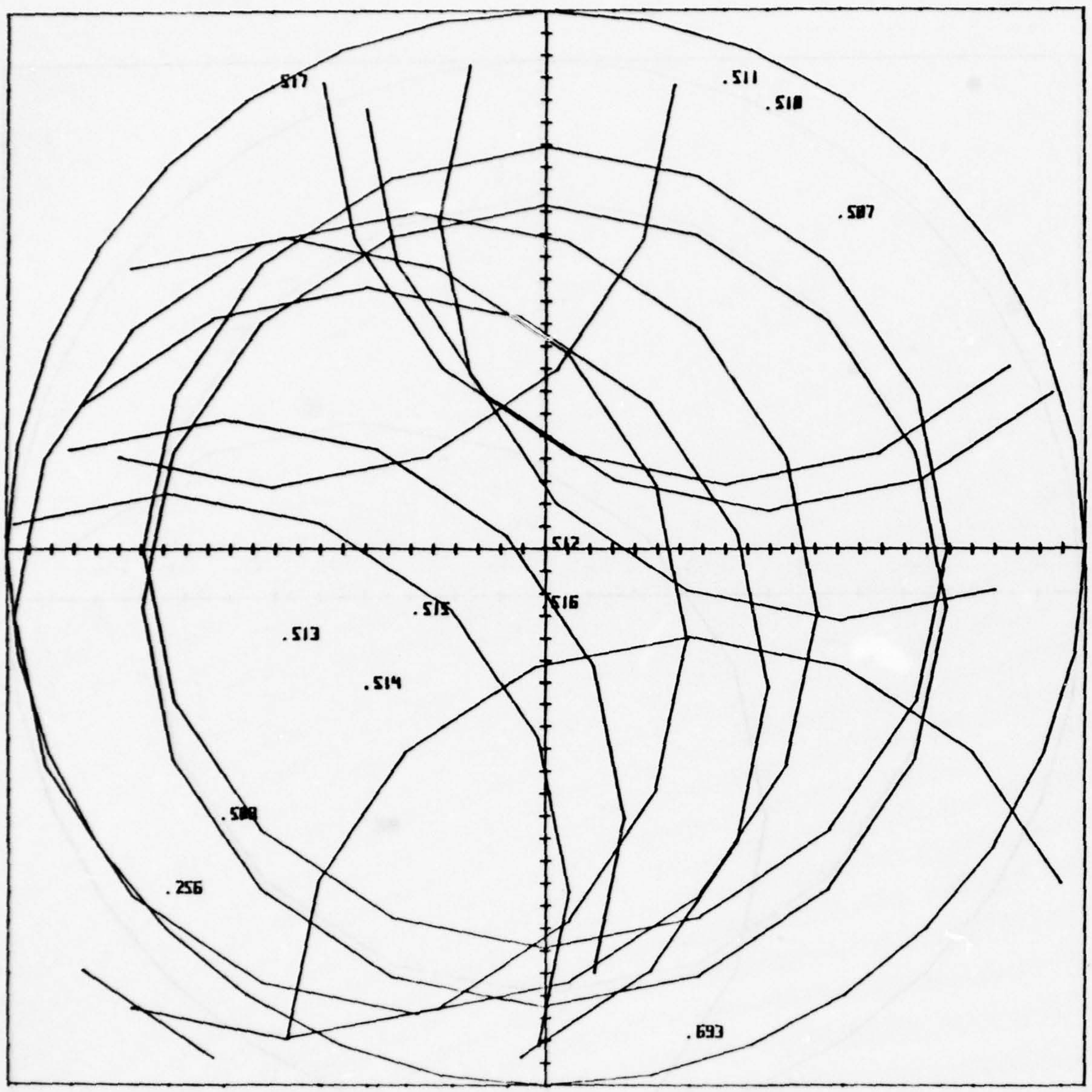
CHARLOTTE, N. C.



SIZE OF AREA (RADIUS [illegible] 5

FILE # 378 USED AS NOMINAL SITE

RADAR # 378 WITHIN 0 NM
RADAR # 393 WITHIN 32.21638569 NM
RADAR # 394 WITHIN 32.21638569 NM
***** ***** ***** ***** *****



CMH

COLUMBUS, OHIO

HEIGHT 4000 GIVES RADIUS 89.44271
SIZE OF AREA (RADIUS (NM)) 120

FILE # 512 USED AS NOMINAL SITE

RADAR	# 256	WITHIN	114.0944666	
RADAR	# 507	WITHIN	98.45166943	
RADAR	# 508	WITHIN	93.95796289	
RADAR	# 509	WITHIN	93.95796289	
RADAR	# 510	WITHIN	109.6458407	
RADAR	# 511	WITHIN	111.0306338	
RADAR	# 512	WITHIN	0	NM
RADAR	# 513	WITHIN	61.45065464	
RADAR	# 514	WITHIN	50.64419745	
RADAR	# 515	WITHIN	32.44551634	
RADAR	# 516	WITHIN	13.10789607	
RADAR	# 517	WITHIN	119.5384207	
RADAR	# 693	WITHIN	113.7340415	
****	*****	*****	*****	*****

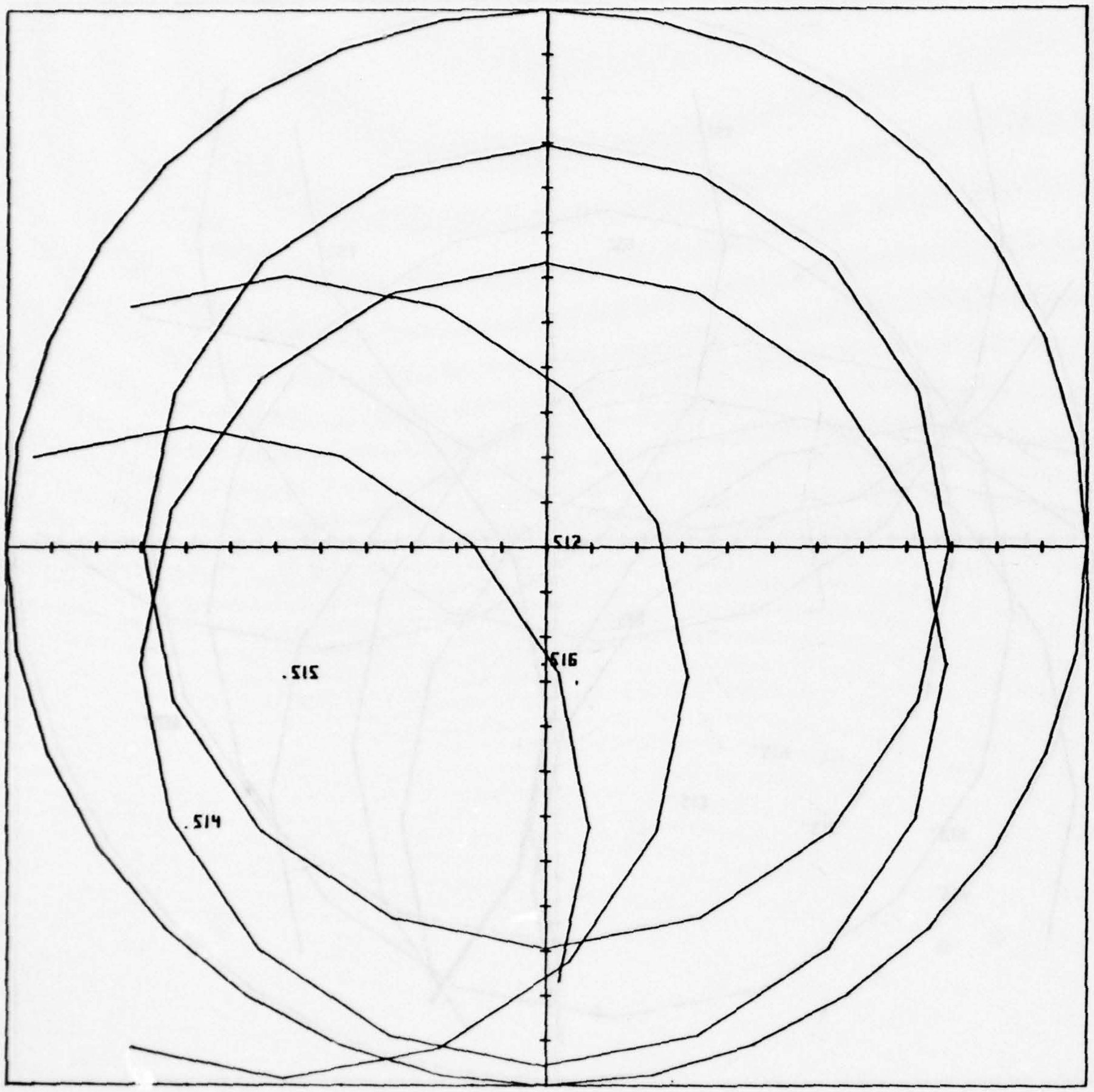
C M H

COLUMBUS, OHIO

WEIGHT 35955
SIZE OF AREA RADIUS (NM) 60

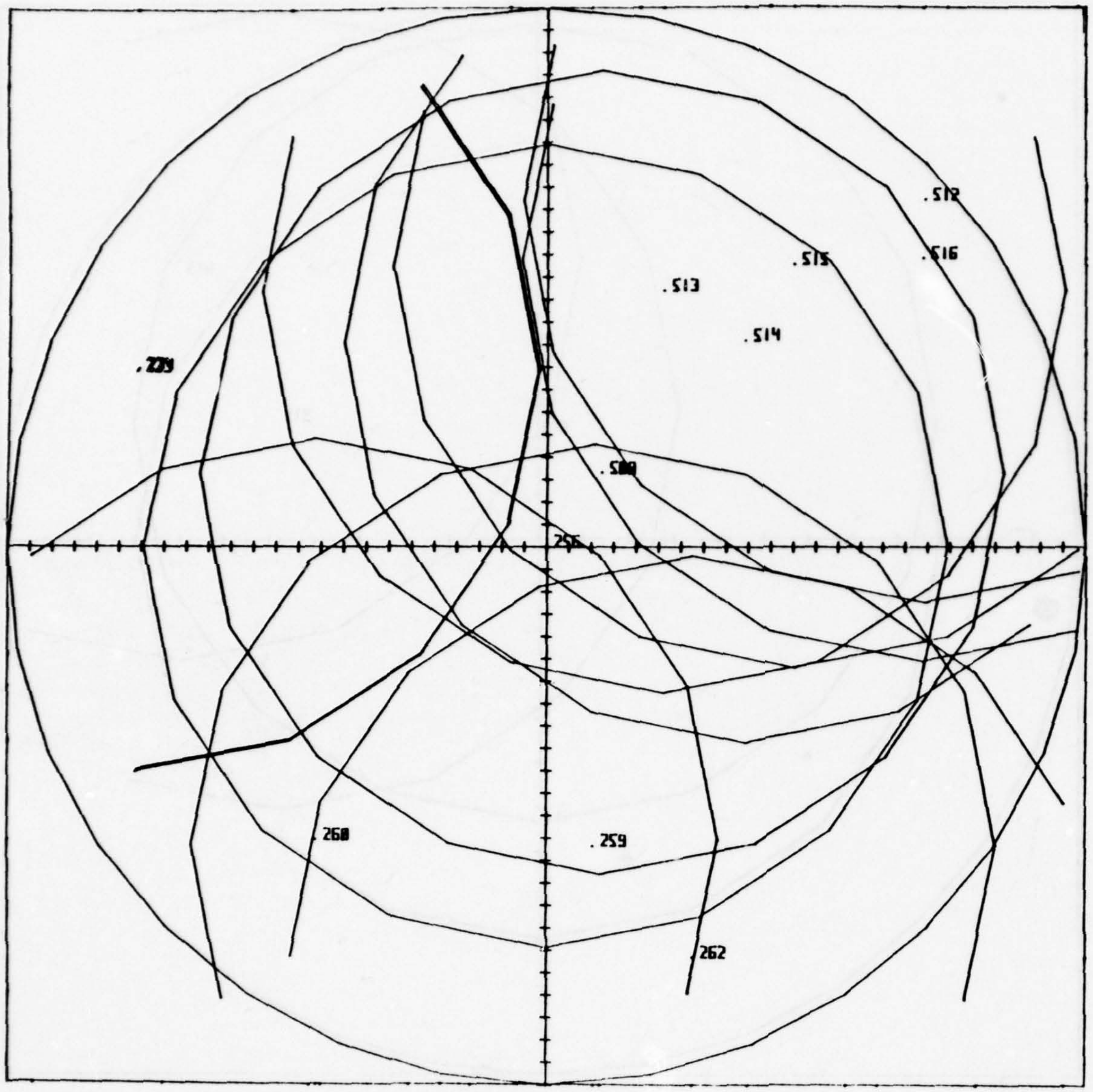
SITE # 512 USED AS NOMINAL SITE

RADAR # 512 WITHIN 0 NM
RADAR # 514 WITHIN 50.64419745 NM
RADAR # 515 WITHIN 32.44551634 NM
RADAR # 516 WITHIN 13.10789607 NM
***** ***** ***** ***** *****



C V G

CINCINNATI, OHIO
(COVINGTON)



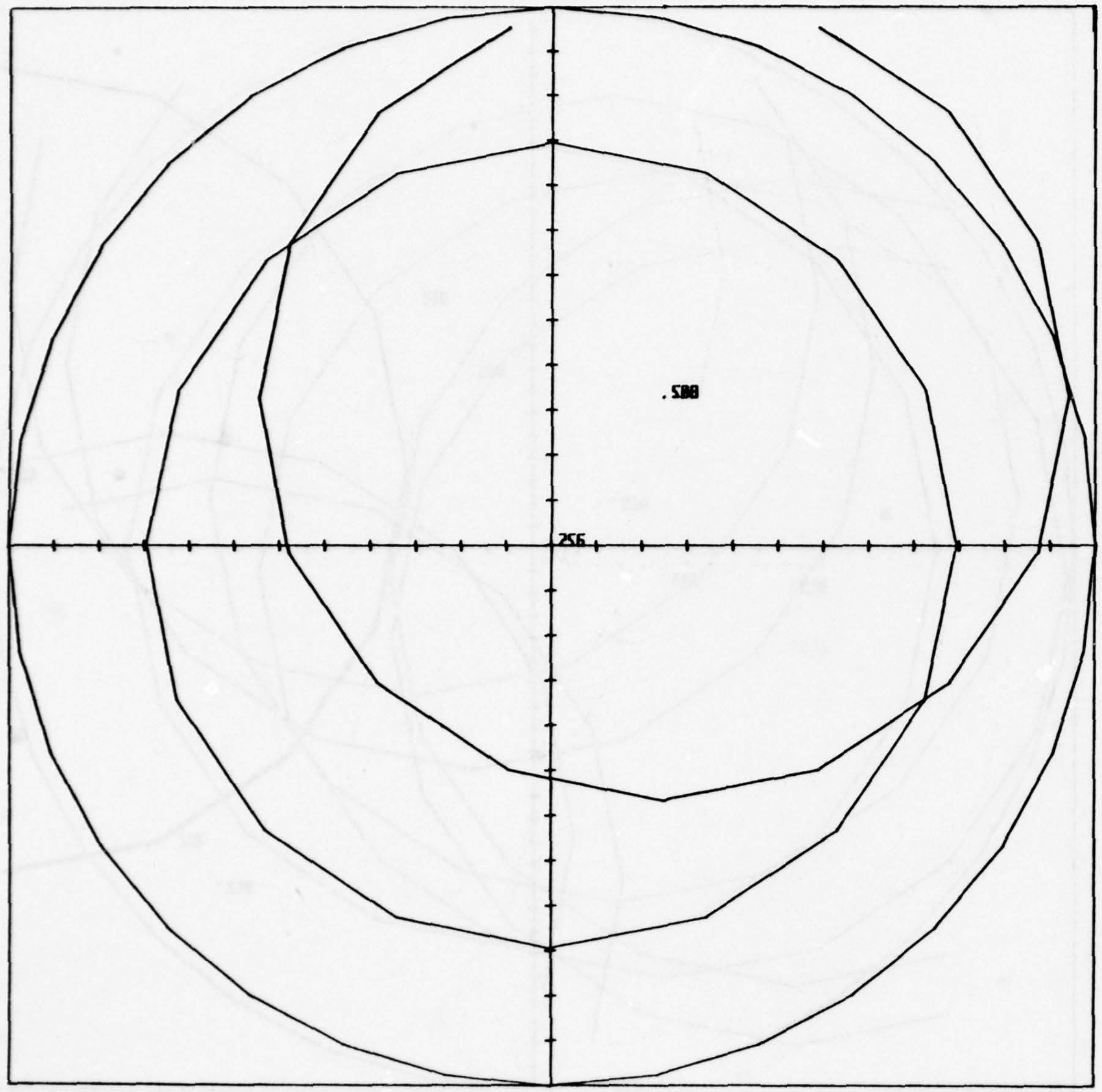

```
HEIGHT 4000    GIVES RADIUS 89.4427191
SIZE OF AREA (RADIUS (NM)) 120

SITE # 256  USED AS NOMINAL SITE

  RADAR # 233  WITHIN 99.3662412    NM
  RADAR # 234  WITHIN 99.21628872   NM
  RADAR # 256  WITHIN 0     NM
  RADAR # 259  WITHIN 67.5359117    NM
  RADAR # 260  WITHIN 83.0656[illegible]  NM
  RADAR # 262  WITHIN 57.09712414   NM
  RADAR # 508  WITHIN 20.54580087   NM
  RADAR # 509  WITHIN 20.54580087   NM
  RADAR # 512  WITHIN 114.0344666   NM
  RADAR # 513  WITHIN 62.54757466   NM
  RADAR # 514  WITHIN 63.71763037   NM
  RADAR # 515  WITHIN [illegible]58847924   NM
  RADAR # 516  WITHIN 105.4427128   NM
*****  *****  *****  *****  *****
```

C V G

CINCINNATI, OHIO
(COVINGTON)



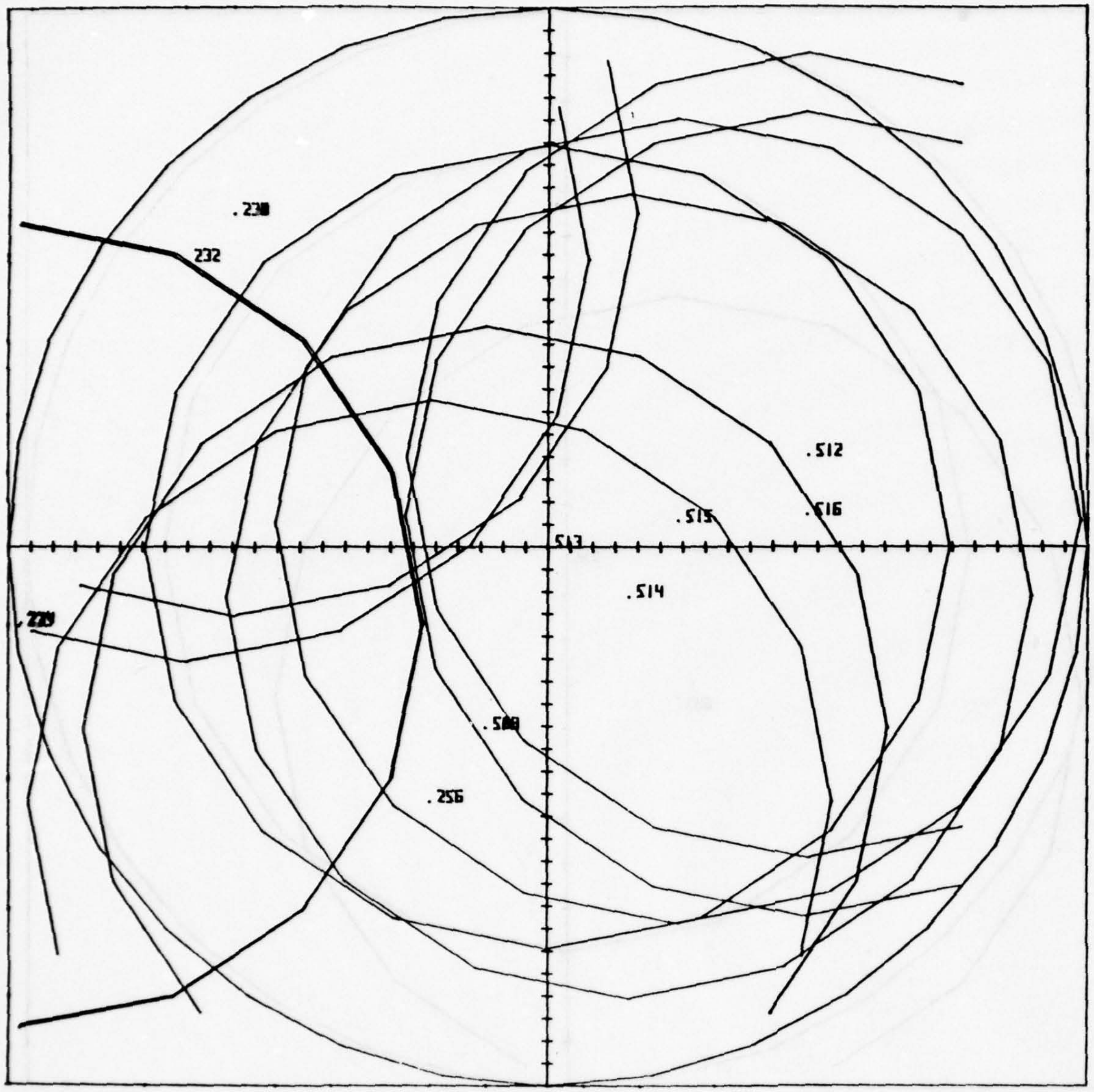
HEIGH ... 5955
SIZE ... RADIUS (NM): 60

FILE # 256 USED AS NOMINAL SITE

RADAR # 256 WITHIN 0 NM
RADAR # 508 WITHIN 20.54580887 NM
RADAR # 509 WITHIN 20.54580887 NM
***** ***** ***** ***** *****

D A Y

DAYTON, OHIO



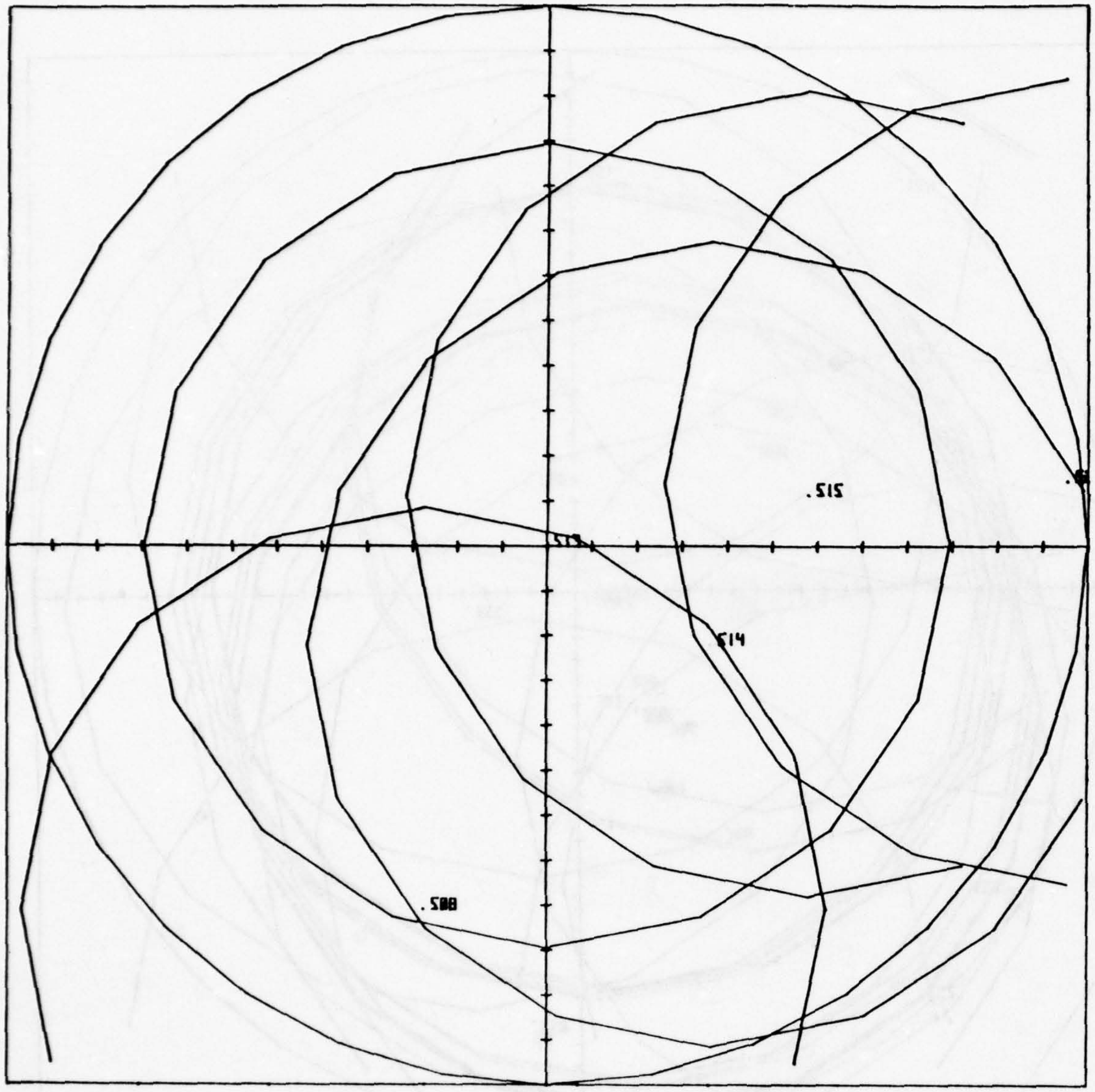

```
RADIUS 89.4427
(NM) > 120

E # 513 USED AS NOMINAL SITE

RADAR # 230  WITHIN 101.5124627
RADAR # 232  WITHIN 102.5558227
RADAR # 233  WITHIN 113.021183
RADAR # 234  WITHIN 118.3386148    NM
RADAR # 256  WITHIN 62.54757466    NM
RADAR # 508  WITHIN 42.71618392
RADAR # 509  WITHIN 42.71618392
RADAR # 512  WITHIN 61.45065464
RADAR # 513  WITHIN 0    NM
RADAR # 514  WITHIN 21.24841784
RADAR # 515  WITHIN 29.57283458
RADAR # 516  WITHIN 58.15853873
***  *****  *****  *****  *****
```

DAY

DAYTON, OHIO



HEIGHT 1000 GIVES RADIUS 44.721359

SIZE OF AREA (RADIUS (NM)) 60

SITE # 513 USED AS NOMINAL SITE

RADAR # 508 WITHIN 42.71618392 N

RADAR # 509 WITHIN 42.71618392 N

RADAR # 513 WITHIN 0 NM

RADAR # 514 WITHIN 21.24841784 N

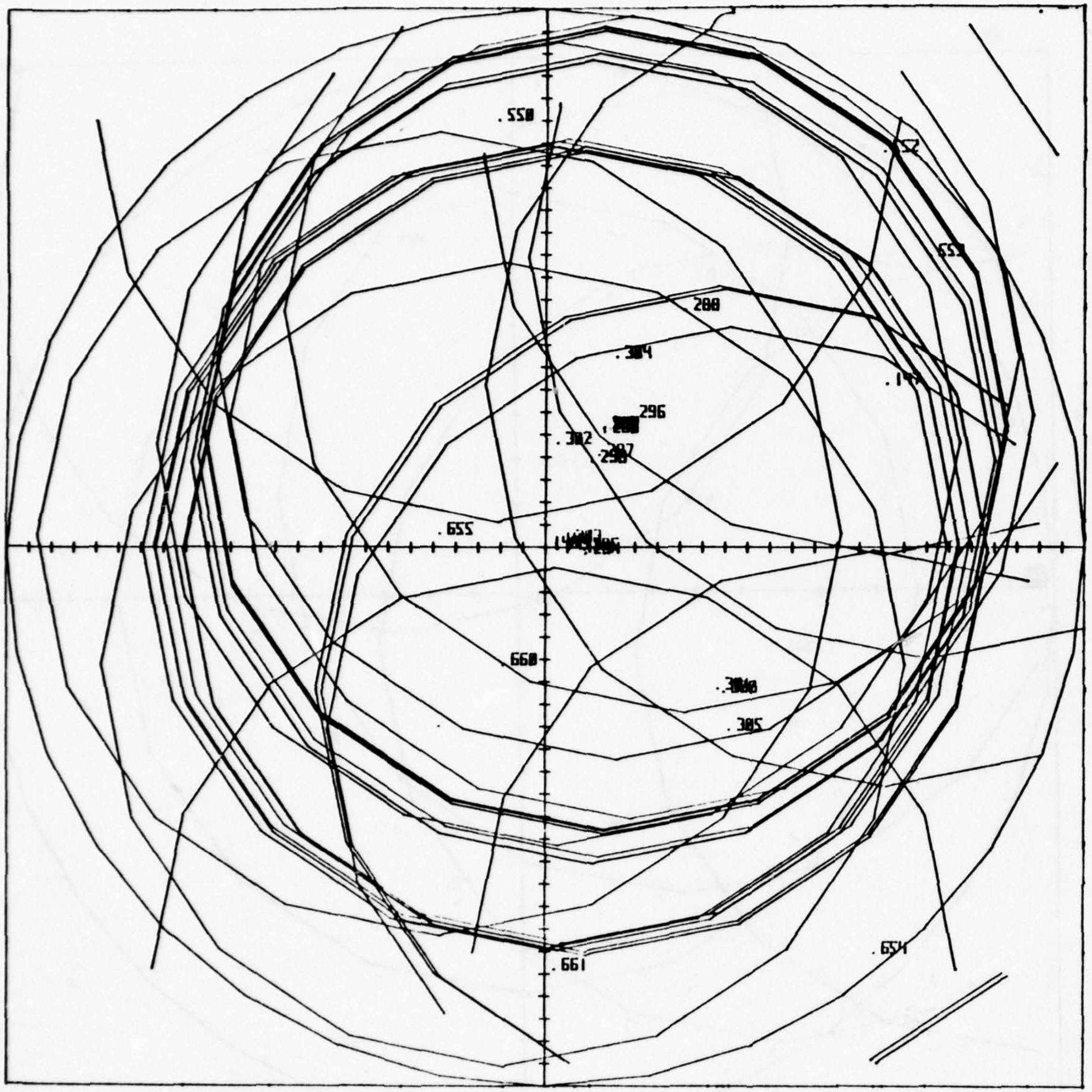
RADAR # 515 WITHIN 29.57283453 N

RADAR # 516 WITHIN [illegible]

**** ***** *****

DCA

WASHINGTON NATL.



HEIGHT 4000 GIVES RADIUS 89.44271910
SIZE OF AREA (RADIUS (NM)) 120

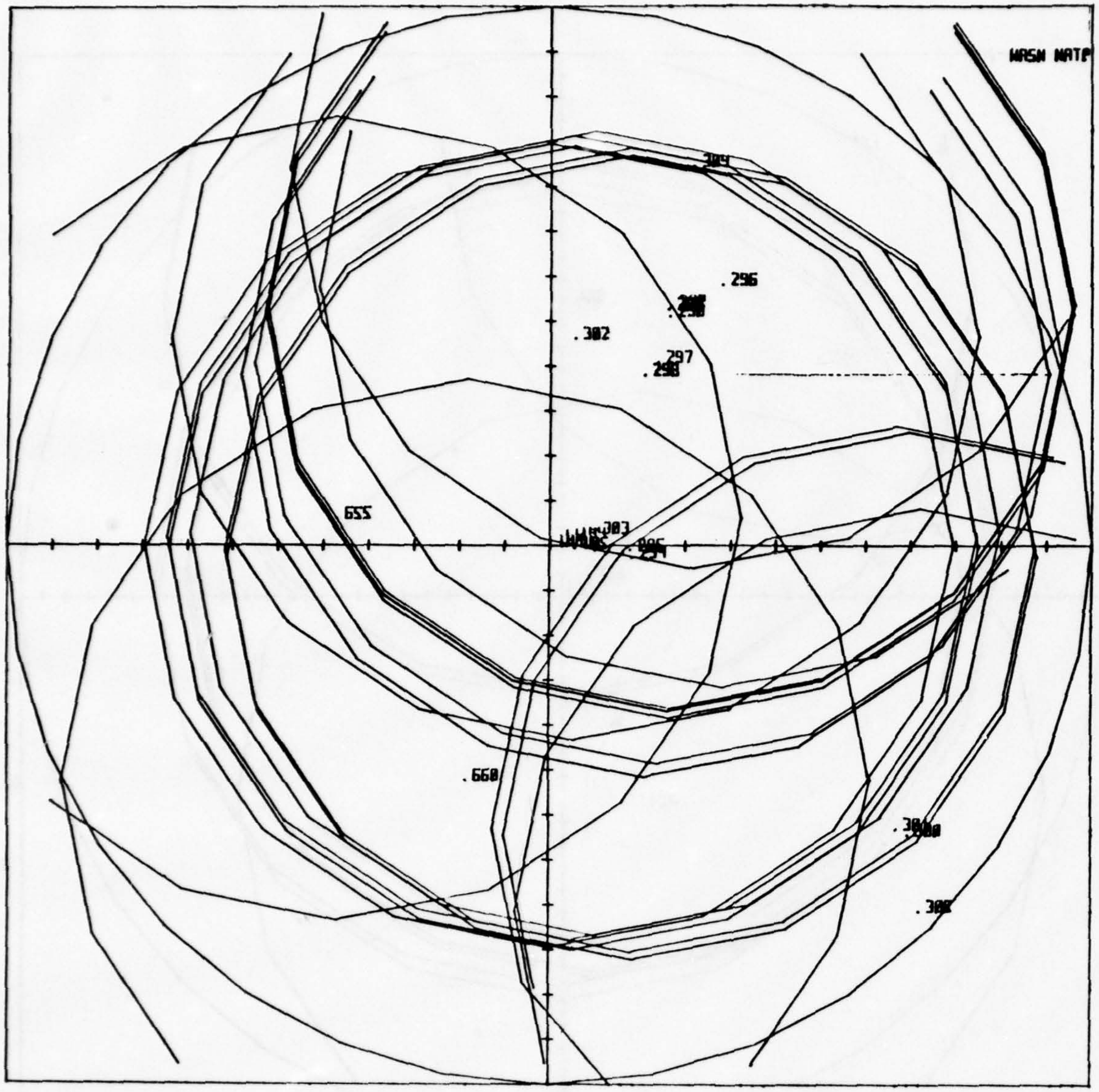
FILE # 146 USED AS NOMINAL SITE

RADAR #	144	WITHIN	2.672036083	N
RADAR #	145	WITHIN	2.761731026	N
RADAR #	146	WITHIN	0	NM
RADAR #	147	WITHIN	64.19847467	N
RADAR #	288	WITHIN	61.15902703	N
RADAR #	289	WITHIN	29.38431624	N
RADAR #	290	WITHIN	28.78142461	N
RADAR #	291	WITHIN	29.38431624	N
RADAR #	292	WITHIN	29.00255877	N
RADAR #	293	WITHIN	29.38431624	N
RADAR #	294	WITHIN	9.270966128	N
RADAR #	295	WITHIN	8.943677956	N
RADAR #	296	WITHIN	34.720652	NM
RADAR #	297	WITHIN	23.69301358	NI
RADAR #	298	WITHIN	21.67495641	NI
RADAR #	299	WITHIN	21.67495641	NI
RADAR #	300	WITHIN	51.16162834	NI
RADAR #	301	WITHIN	49.74807157	NI
RADAR #	302	WITHIN	23.22331742	NI
RADAR #	303	WITHIN	5.278422132	NI
RADAR #	304	WITHIN	45.09373299	NI
RADAR #	305	WITHIN	57.72401913	NI
RADAR #	550	WITHIN	95.70721661	NI
RADAR #	552	WITHIN	115.6998115	NI
RADAR #	553	WITHIN	107.3590703	NI
RADAR #	654	WITHIN	116.313553	NI
RADAR #	655	WITHIN	23.70445095	NI
RADAR #	660	WITHIN	37.74016104	NI
RADAR #	661	WITHIN	94.00920134	NI

***** ***** ***** ***** *****

DCA

WASHINGTON NATL.



HEIGHT 100 5955

SIZE OF AREA (RADIUS (NM)) 60

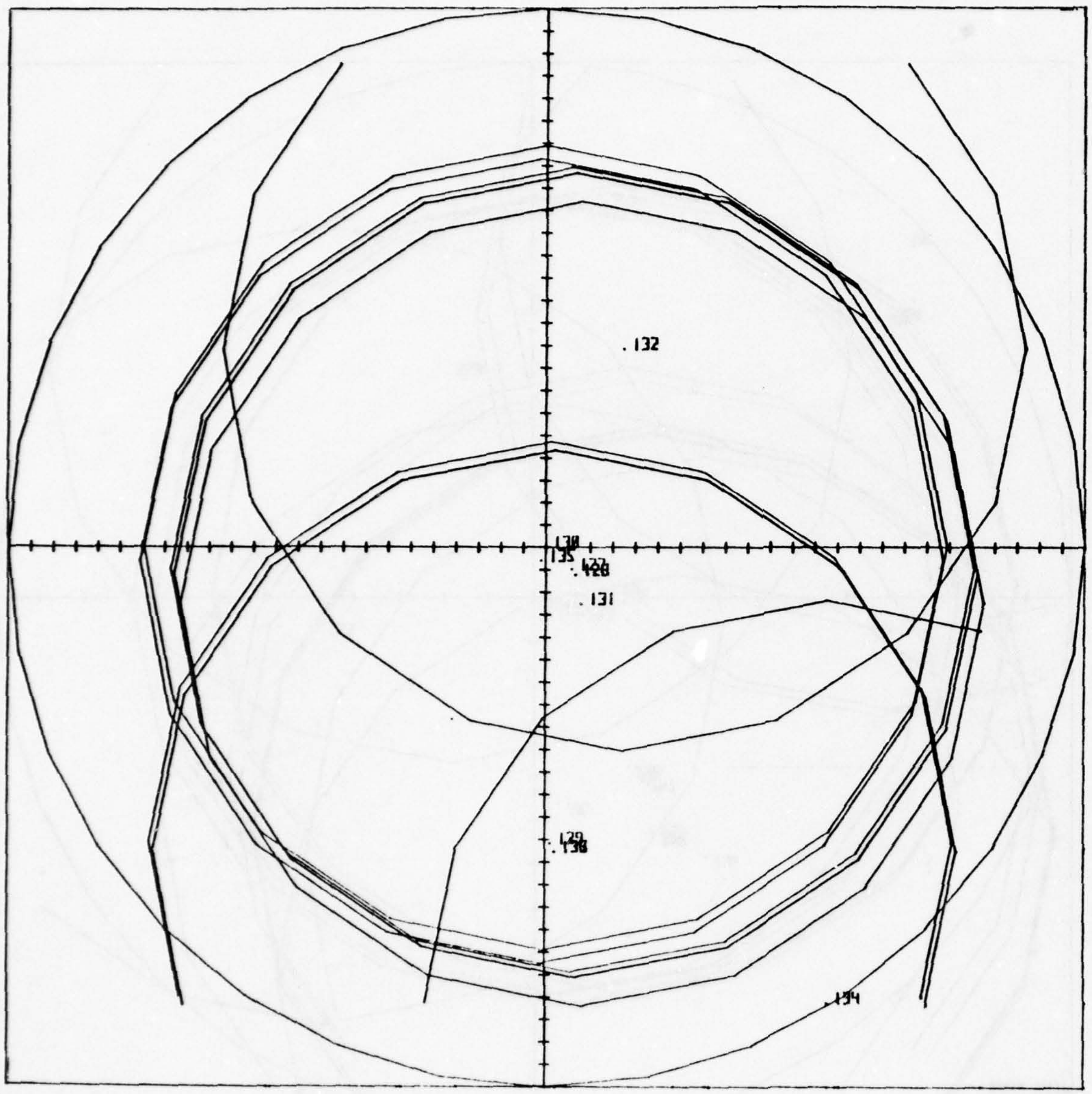
FILE # 146 USED AS NOMINAL SITE

FRAME #	144	WITHIN	2.67036083	NM
FRAME #	145	WITHIN	2.761731026	NM
FRAME #	146	WITHIN	0	NM
FRAME #	289	WITHIN	29.38471624	NM
FRAME #	290	WITHIN	28.78142461	NM
FRAME #	291	WITHIN	29.38431624	NM
FRAME #	292	WITHIN	29.80255877	NM
FRAME #	293	WITHIN	29.38431624	NM
FRAME #	294	WITHIN	9.270966128	NM
FRAME #	295	WITHIN	8.943677956	NM
FRAME #	296	WITHIN	14.770652	NM
FRAME #	297	WITHIN	23.64301358	NM
FRAME #	298	WITHIN	21.67495641	NM
FRAME #	299	WITHIN	21.67495641	NM
FRAME #	300	WITHIN	51.16162834	NM
FRAME #	301	WITHIN	49.74807157	NM
FRAME #	302	WITHIN	[illegible]	NM
FRAME #	303	WITHIN	5.270422132	NM
FRAME #	304	WITHIN	45.09373299	NM
FRAME #	305	WITHIN	57.72401913	NM
FRAME #	655	WITHIN	23.70445095	NM
FURN		[illegible]	27.50010104	NM

.....

DEN

DENVER, COLORADO



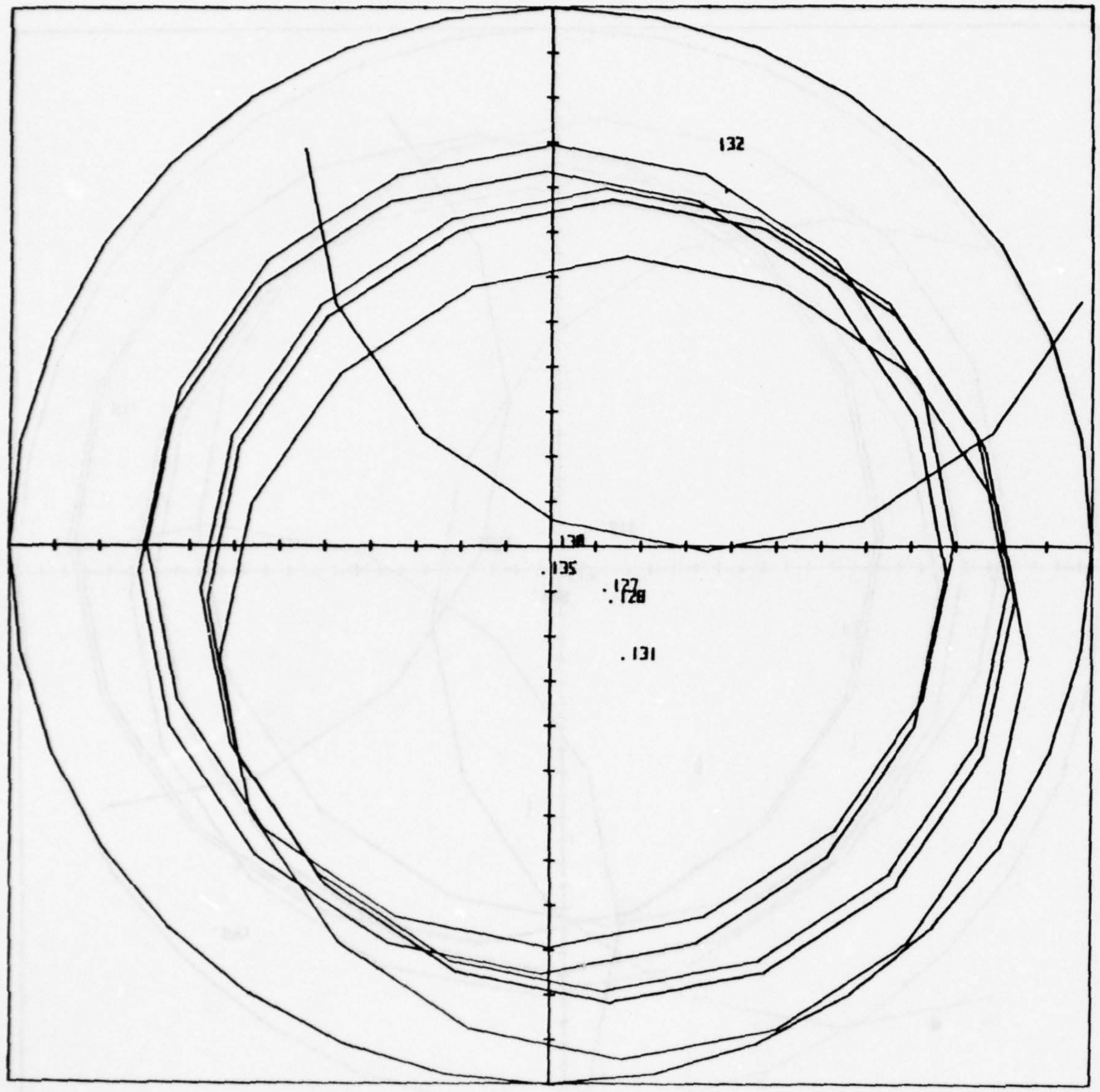

```
IGHT 4000      GIVES RADIUS 89.442719
ZE OF AREA (RADIUS (NM)) 120

LE # 130  USED AS NOMINAL SITE

RADAR # 126  WITHIN 9.122357092   N
RADAR # 127  WITHIN 7.745640557   N
RADAR # 128  WITHIN 9.122357092   N
RADAR # 129  WITHIN 65.82164902   N
RADAR # 130  WITHIN 0     NM
RADAR # 131  WITHIN 14.94035848   N
RADAR # 132  WITHIN 47.51354500   N
RADAR # 134  WITHIN 119.13340  NM
RADAR # 135  WITHIN 3.078924300   N
RADAR # 136  WITHIN 67.72106378   N
RADAR # 137  WITHIN 67.72106378   N
****  *****  *****  *****  *****
```

DEN

DENVER, COLORADO

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HE[illegible] 44.2135955
SIZE OF AREA (RADIUS (NM)) 60

FILE # 130  USED AS NOMINAL SITE

  RADAR # 126  WITHIN 9.122357092   NM
  RADAR # 127  WITHIN 7.745640557   NM
  RADAR # 128  WITHIN 9.122357092   NM
  RADAR # 130  WITHIN 0    NM
  RADAR # 131  WITHIN 14.94035848   NM
  RADAR # 132  WITHIN 47.51354500   NM
  RADAR # 135  WITHIN 3.078924300   NM
***
```
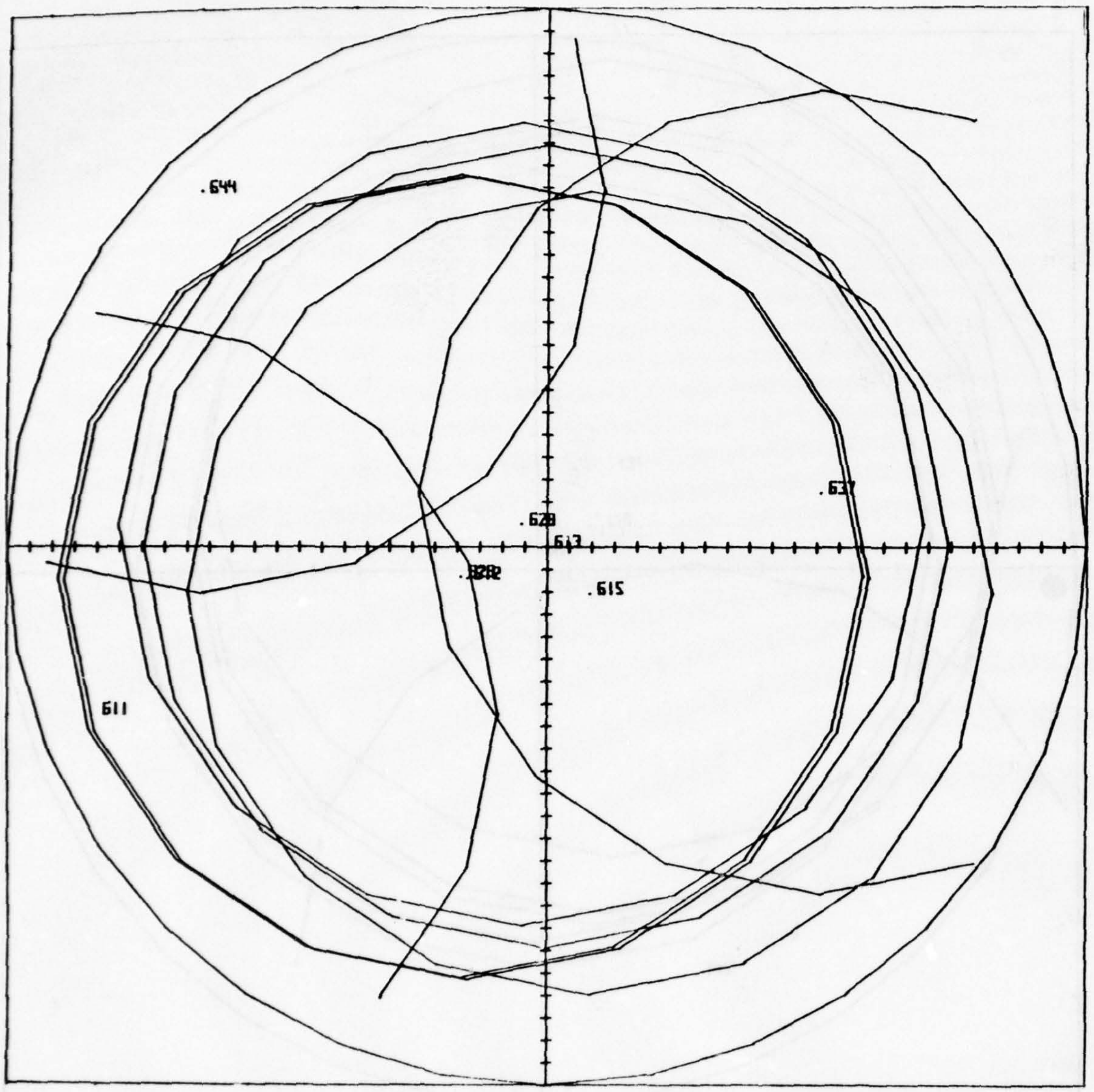

DFW

DALLAS/FT. WORTH REGIONAL

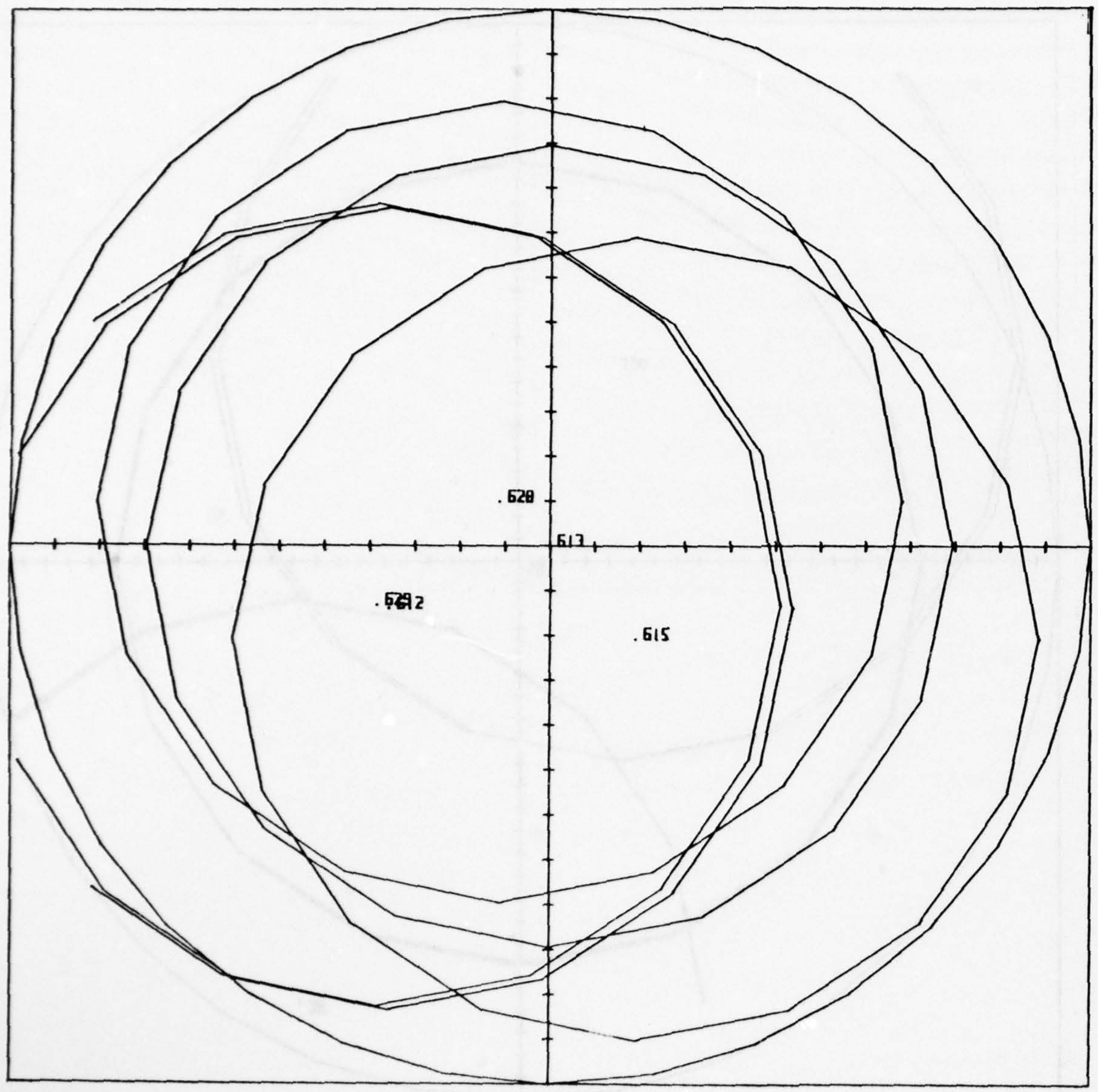


HEIGHT 4000   GIVES RADIUS 89.442719
SIZE OF AREA (RADIUS (NM)) 120

FILE # 613 USED AS NOMINAL SITE

RADAR # 611	WITHIN	107.0766784	N
RADAR # 612	WITHIN	19.14813333	N
RADAR # 613	WITHIN	0	NM	
RADAR # 615	WITHIN	14.1103202	N
RADAR # 628	WITHIN	7.44169608	N
RADAR # 629	WITHIN	20.24950244	N
RADAR # 637	WITHIN	62.11442559	N
RADAR # 644	WITHIN	110.2040724	N

*** ***** ***** ***** *****



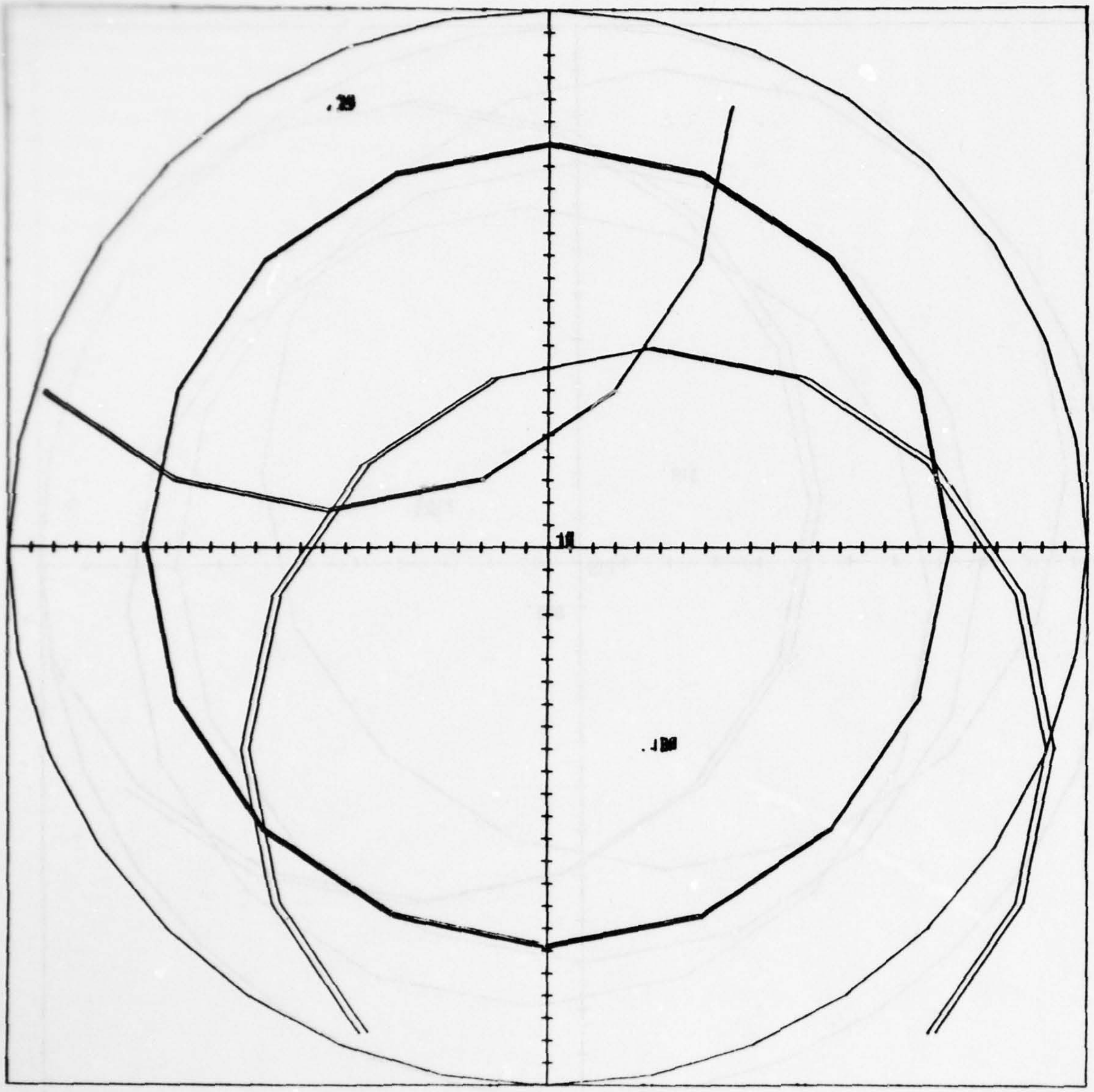
D F W

DALLAS/FT. WORTH REGIONAL

HEIGHT ... 55
SIZE OF AREA (RADIUS (NM)) 60

FILE # 613 USED AS NOMINAL SITE

RADAR # 612 WITHIN 19.14813338 NM
RADAR # 613 WITHIN 0 NM
RADAR # 615 WITHIN 14.1103202 NM
RADAR # 628 WITHIN 7.44169608 NM
RADAR # 629 WITHIN 20.24950244 NM

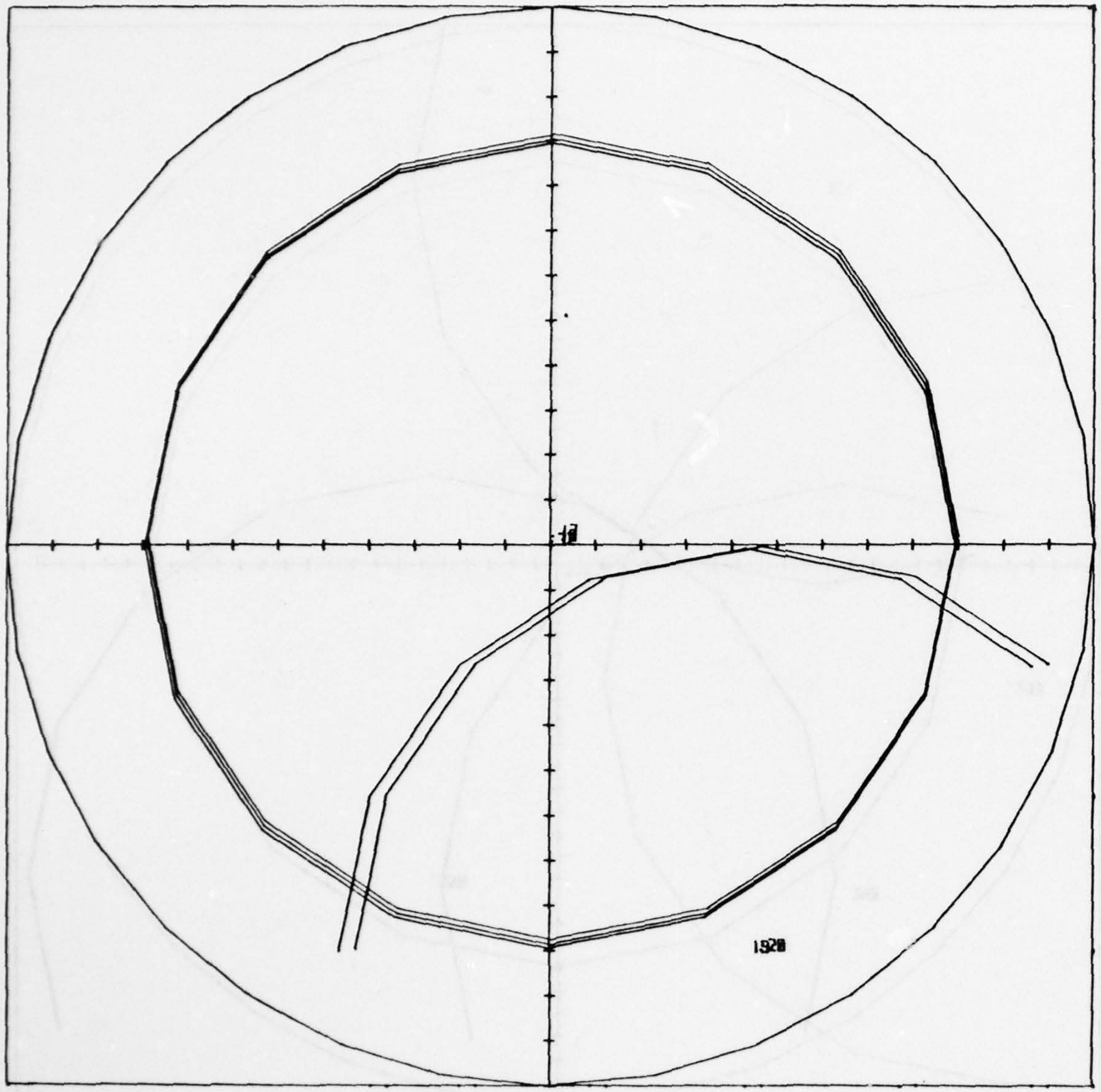


D M A

TUSCON, ARIZONA

DAVIS MONTHAN

```
IGHT 4000     GIVES RADIUS 89.442719
IZE OF AREA (RADIUS (NM)) 120

ILE # 32   USED AS NOMINAL SITE

 RADAR # 17   WITHIN 1.034609187   N
 RADAR # 18   WITHIN 0.478737498   N
 RADAR # 19   WITHIN 50.00132524   N
 RADAR # 20   WITHIN 50.60673551   N
 RADAR # 28   WITHIN 109.52112  NM
 RADAR # 30   WITHIN 109.0525197   N
 RADAR # 31   WITHIN 109.0525197   N
 RADAR # 32   WITHIN 0    NM
 ***  *****  *****  *****  *****
```



DMA

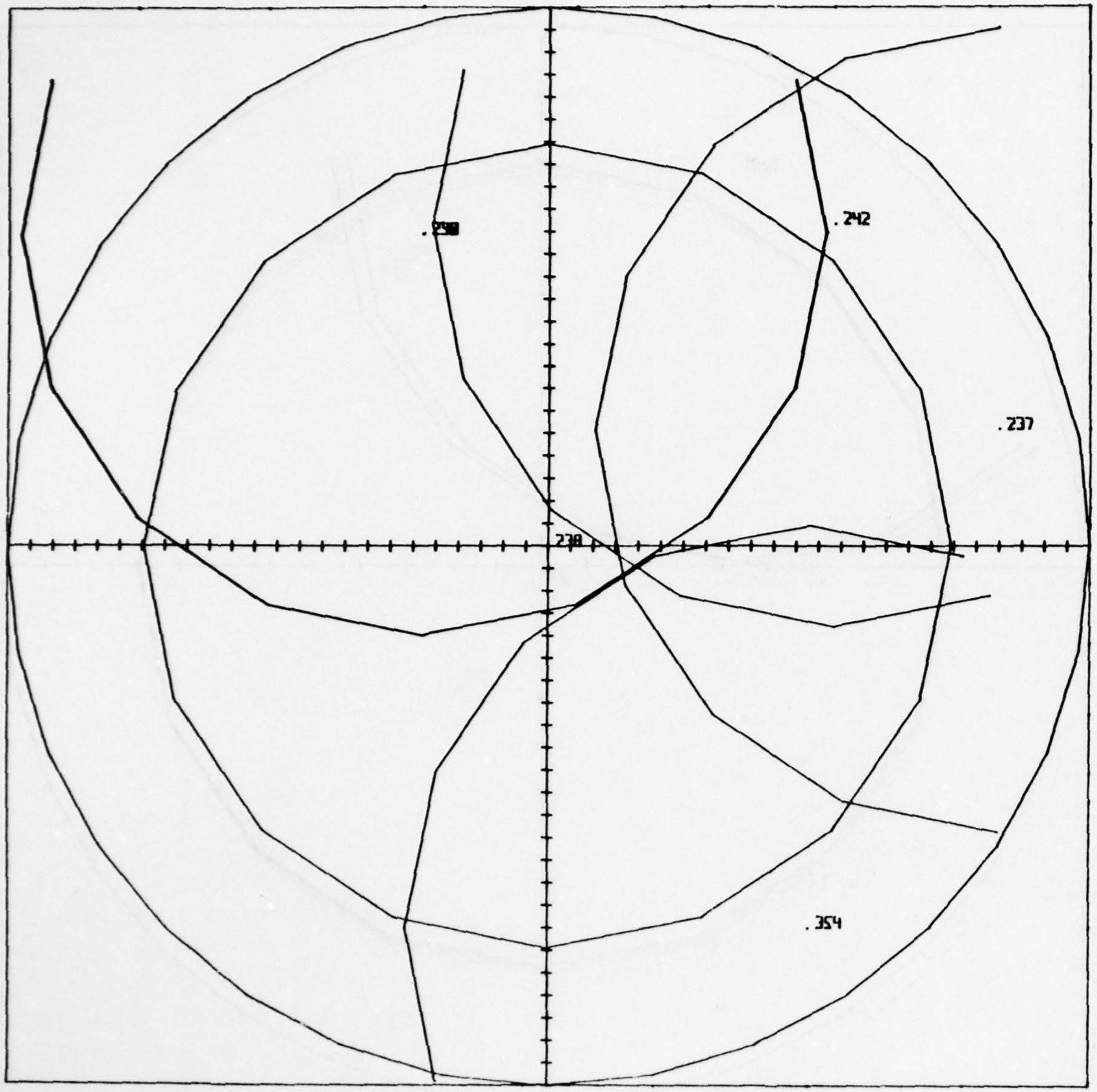
TUSCON, ARIZONA

DAVIS MONTHAN

```
IGHT 1000     GIVES RADIUS 44.7213
ZE OF AREA  RADIUS (NM)  60

ILE # 32   USED AS NOMINAL SITE

 RADAR # 17   WITHIN 1.034669187
 RADAR # 18   WITHIN 0.478737498
 RADAR # 19   WITHIN 50.00132524
 RADAR # 20   WITHIN 50.60673551
 RADAR # 32   WITHIN 0     NM
****  *****  *****  *****  *****
```

DSM

DES MOINES, IOWA



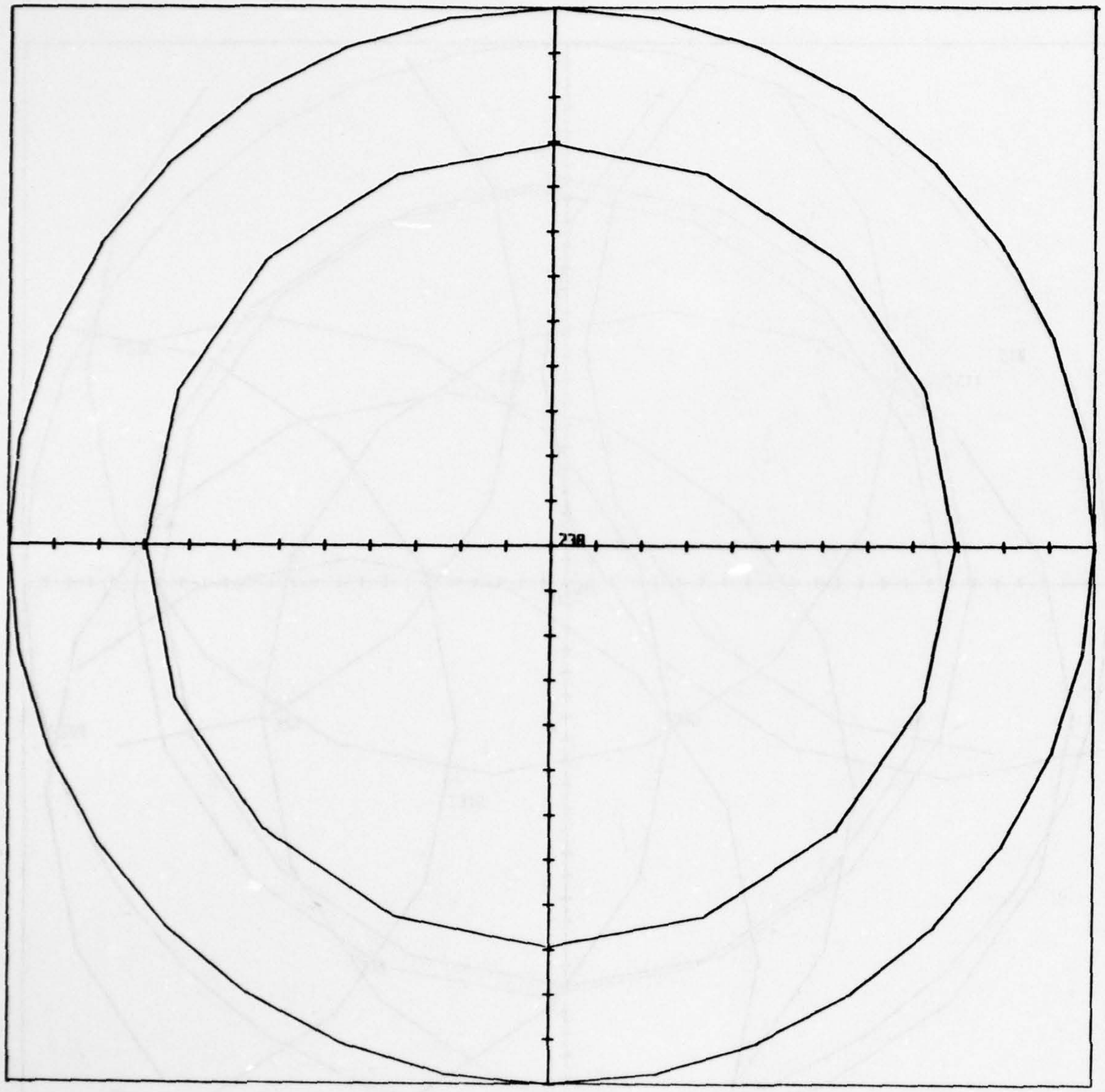
IGHT 4000 GIVES RADIUS 89.44271
ZE OF AREA RADIUS (NM) 120

E # 238 USED AS NOMINAL SITE

RADAR # 237 WITHIN 103.1643970
RADAR # 238 WITHIN 0 NM
RADAR # 239 WITHIN 74.8390667
RADAR # 240 WITHIN 74.85708461
RADAR # 242 WITHIN 95.7253844
RADAR # 354 WITHIN 102.7547351
*** ***** ***** ***** *****

DSM

DES MOINES, IOWA



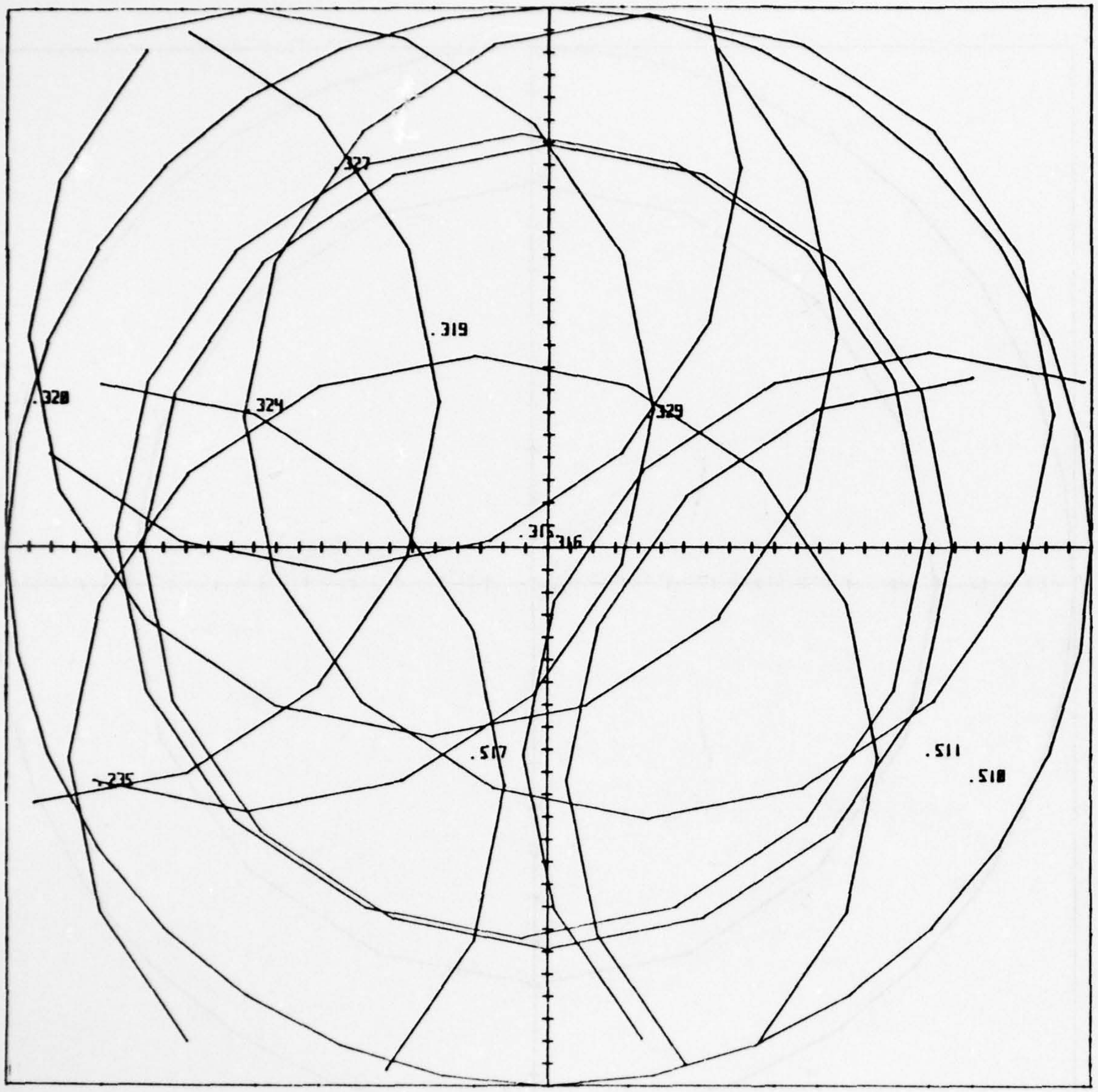
GHT 1000   GIVES RADIUS 44.721359
E OF AREA (RADIUS (NM)) 60

E # 238 USED AS NOMINAL SITE

RADAR # 238 WITHIN 0   NM
** ***** ***** ***** *****

DTW

DETROIT-WAYNE

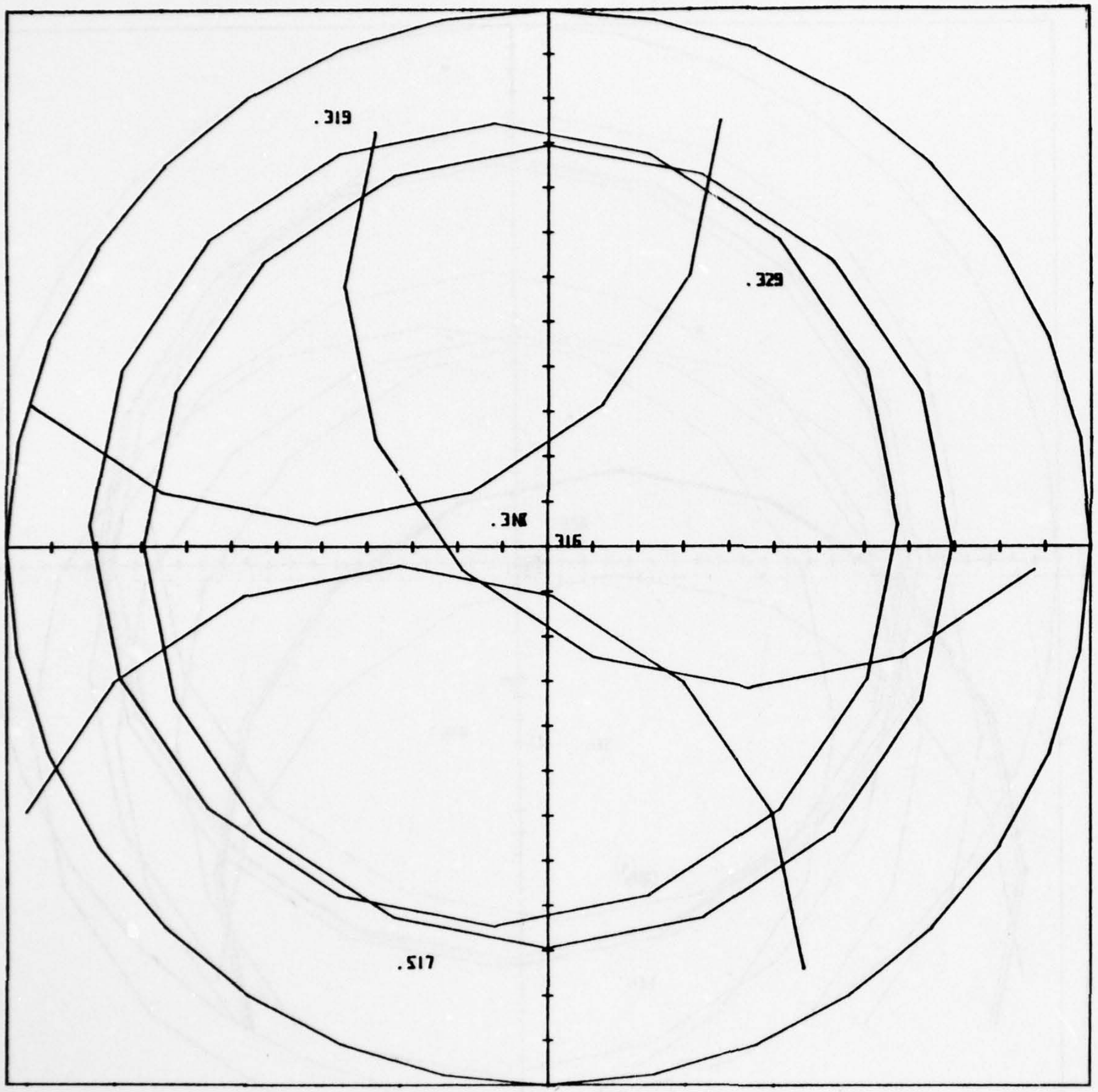


IGHT 4000 GIVES RADIUS 89.4427
ZE OF AREA (RADIUS (NM)) 120

LE # 316 USED AS NOMINAL SITE

RADAR	# 235	WITHIN	113.26075	NM
RADAR	# 315	WITHIN	6.47169375	
RADAR	# 316	WITHIN	0	NM
RADAR	# 319	WITHIN	53.8136519	
RADAR	# 320	WITHIN	118.2035991	
RADAR	# 324	WITHIN	72.88564105	
RADAR	# 327	WITHIN	96.34002548	
RADAR	# 329	WITHIN	36.53024791	
RADAR	# 510	WITHIN	107.1828962	
RADAR	# 511	WITHIN	96.00633251	
RADAR	# 517	WITHIN	49.67799114	

*** ***** ***** ***** *****



D T W

DETROIT-WAYNE

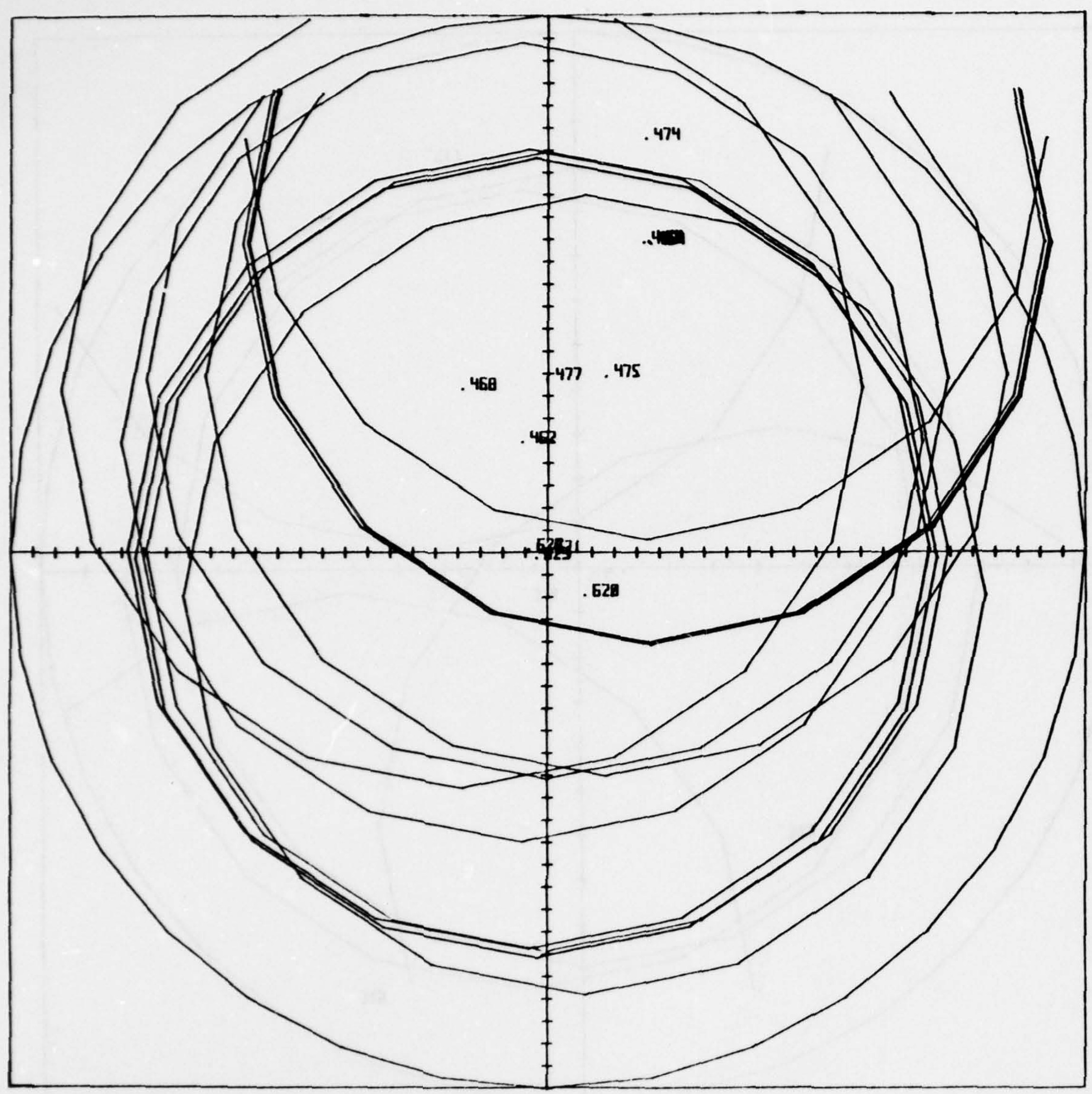
HEIGHT '2135955
SIZE OF AREA (RADIUS (NM)) 60

FILE # 316 USED AS NOMINAL SITE

RADAR # 315 WITHIN 6.47166975 NM
RADAR # 316 WITHIN 0 NM
RADAR # 319 WITHIN 53.8136519 NM
RADAR # 329 WITHIN 36.53024791 NM
RADAR # 517 WITHIN 49.67799114 NM
***** ***** *****

ELP

EL PASO, TEXAS

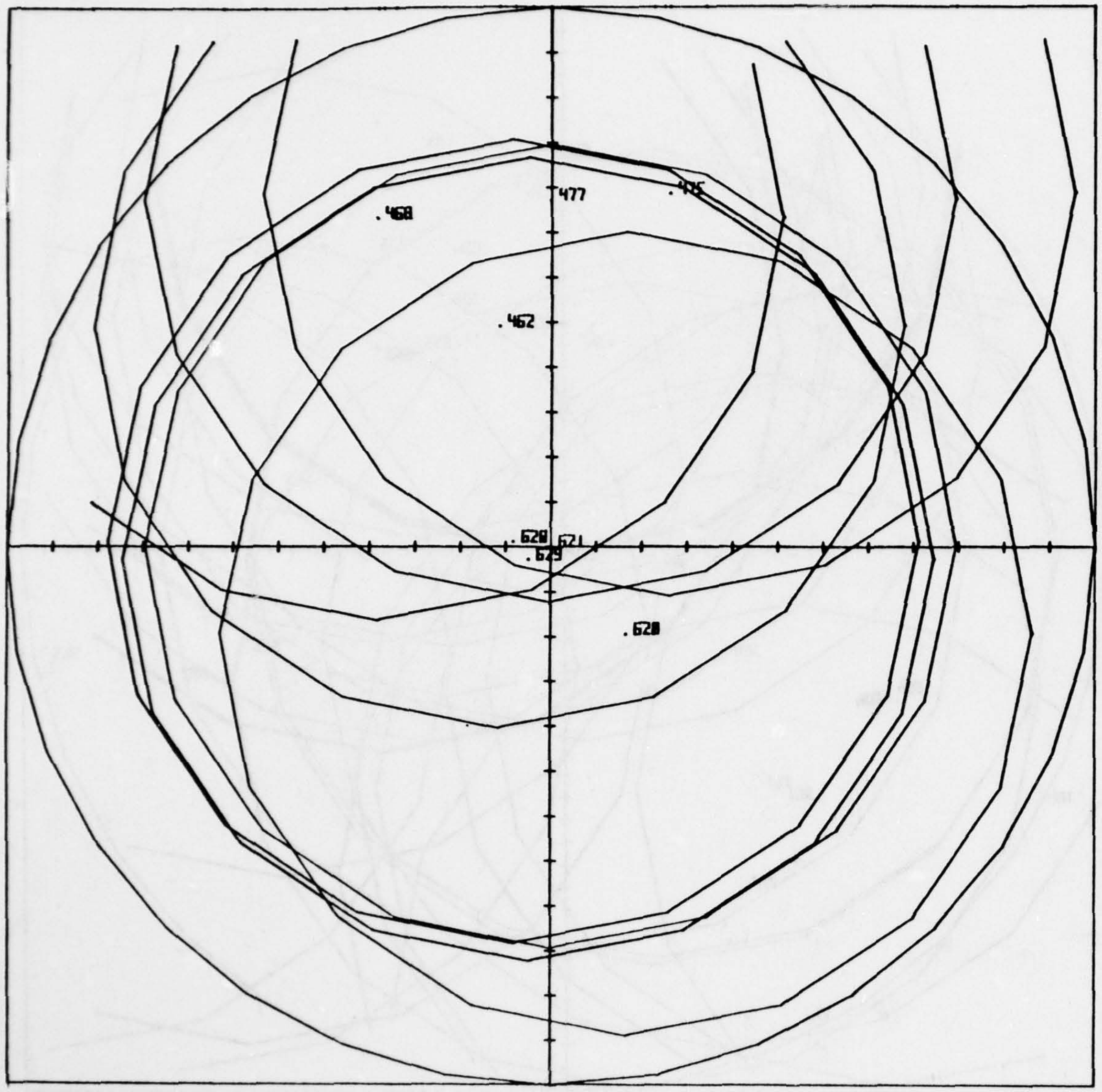


HEIGHT 4000 GIVES RADIUS 89.4427191
IZE OF AREA (RADIUS (NM)) 120

ILE # 621 USED AS NOMINAL SITE

RADAR #	462	WITHIN	25.14017801
RADAR #	464	WITHIN	72.50372766
RADAR #	465	WITHIN	72.25246406
RADAR #	466	WITHIN	72.67912983
RADAR #	467	WITHIN	72.85082828
RADAR #	468	WITHIN	41.19722109
RADAR #	474	WITHIN	94.82743445
RADAR #	475	WITHIN	41.88557564
RADAR #	477	WITHIN	38.55800327
RADAR #	620	WITHIN	12.82851396
RADAR #	621	WITHIN	0 NM
RADAR #	622	WITHIN	4.16059084
RADAR #	623	WITHIN	2.85196339
RADAR #	624	WITHIN	2.85196339
RADAR #	625	WITHIN	4.16059084
RADAR #	626	WITHIN	4.16059084

***** ***** ***** ***** *****



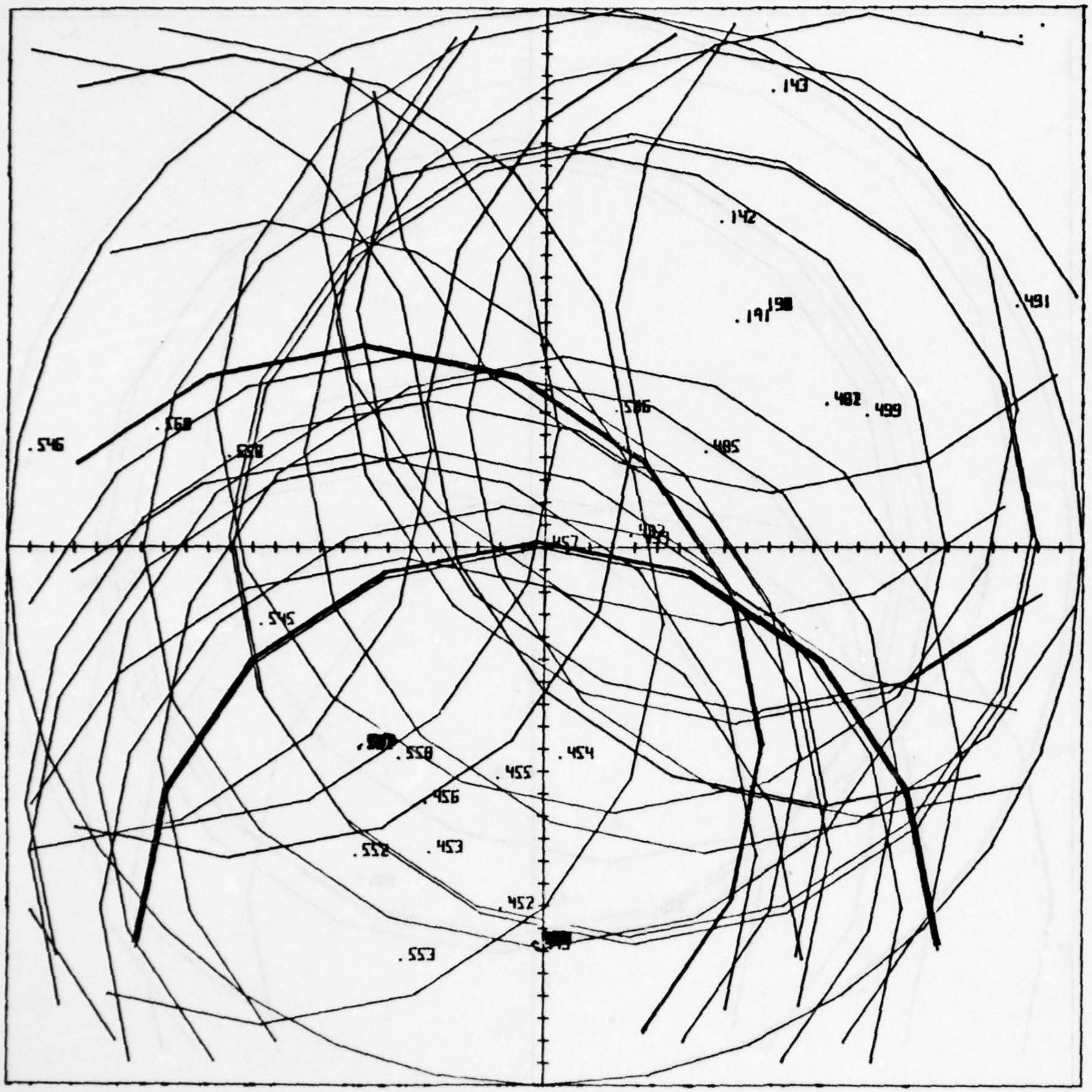
ELP

EL PASO, TEXAS

```
HEIGHT 1000    GIVES RADIUS 44.72135955
  ZE OF AREA RADIUS (NM) 60

  LE # 621  USED AS NOMINAL SITE

  RADAR # 462  WITHIN 25.14017801
  RADAR # 468  WITHIN 41.19722109
  RADAR # 475  WITHIN 41.38557564
  RADAR # 477  WITHIN 38.55800327
  RADAR # 620  WITHIN 12.82851396
  RADAR # 621  WITHIN 0    NM
  RADAR # 622  WITHIN 4.160590840
  RADAR # 623  WITHIN 2.851903390
  RADAR # 624  WITHIN 2.851903390
  RADAR # 625  WITHIN 4.160590840
  RADAR # 626  WITHIN 4.160590840
*****  *****  *****  *****  *****
```

E W R

NEWARK, N. J.



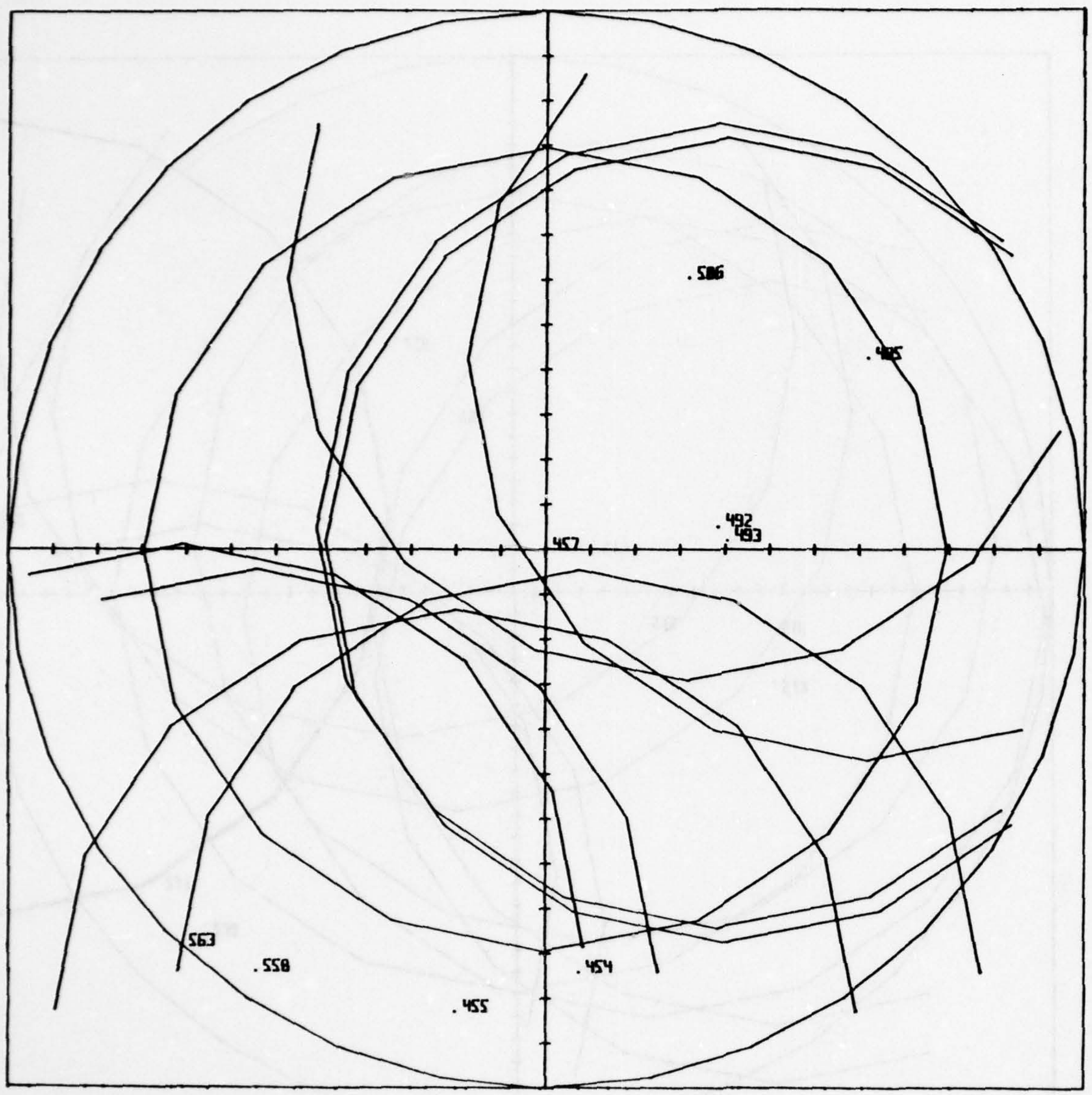
[illegible]UT 4000 GIVES RADIUS 89.44271
[illegible] OF AREA (RADIUS (NM)) 120

[illegible] # 457 USED AS NOMINAL SITE

RADAR	# 139	WITHIN	70.98816763	
RADAR	# 140	WITHIN	70.98816763	
RADAR	# 141	WITHIN	[illegible].01825408	
RADAR	# 142	WITHIN	82.20822799	
RADAR	# 143	WITHIN	113.5120946	
RADAR	# 446	WITHIN	88.29014495	NM
RADAR	# 447	WITHIN	88.46808350	NM
RADAR	# 448	WITHIN	80.02333106	NM
RADAR	# 449	WITHIN	89.5197666[illegible]	NM
RADAR	# 450	WITHIN	88.29014495	NM
RADAR	# 451	WITHIN	80.12265496	NM
RADAR	# 452	WITHIN	81.02930051	NM
RADAR	# 453	WITHIN	72.64369819	NM
RADAR	# 454	WITHIN	17.15613066	NM
RADAR	# 455	WITHIN	52.39544669	NM
RADAR	# 456	WITHIN	62.70022044	NM
RADAR	# 457	WITHIN	0 NM	
RADAR	# 481	WITHIN	70.50401625	NM
RADAR	# 482	WITHIN	70.46640382	NM
RADAR	# 485	WITHIN	41.75925081	NM
RADAR	# 491	WITHIN	110.0008774	NM
RADAR	# 492	WITHIN	19.38981656	NM
RADAR	# 493	WITHIN	20.27119725	NM
RADAR	# 499	WITHIN	77.68301758	NM
RADAR	# 506	WITHIN	34.1363823	NM
RADAR	# 545	WITHIN	25.24386383	NM
RADAR	# 546	WITHIN	[illegible]	NM
RADAR	# 552	WITHIN	[illegible]	[illegible]
RADAR	# 553	WITHIN	[illegible]	[illegible]
RADAR	# 555	WITHIN	[illegible]	[illegible]
RADAR	# 556	WITHIN	[illegible]	[illegible]
RADAR	# 557	WITHIN	[illegible]	
RADAR	# 558	WITHIN	[illegible]	
RADAR	# 560	WITHIN	[illegible]	
RADAR	# 561	WITHIN	[illegible]	
RADAR	# 562	WITHIN	[illegible]	
RADAR	# 563	WITHIN	59.90234811	

***** ***** ***** ***** *****

NEWARK, N. J. E W R



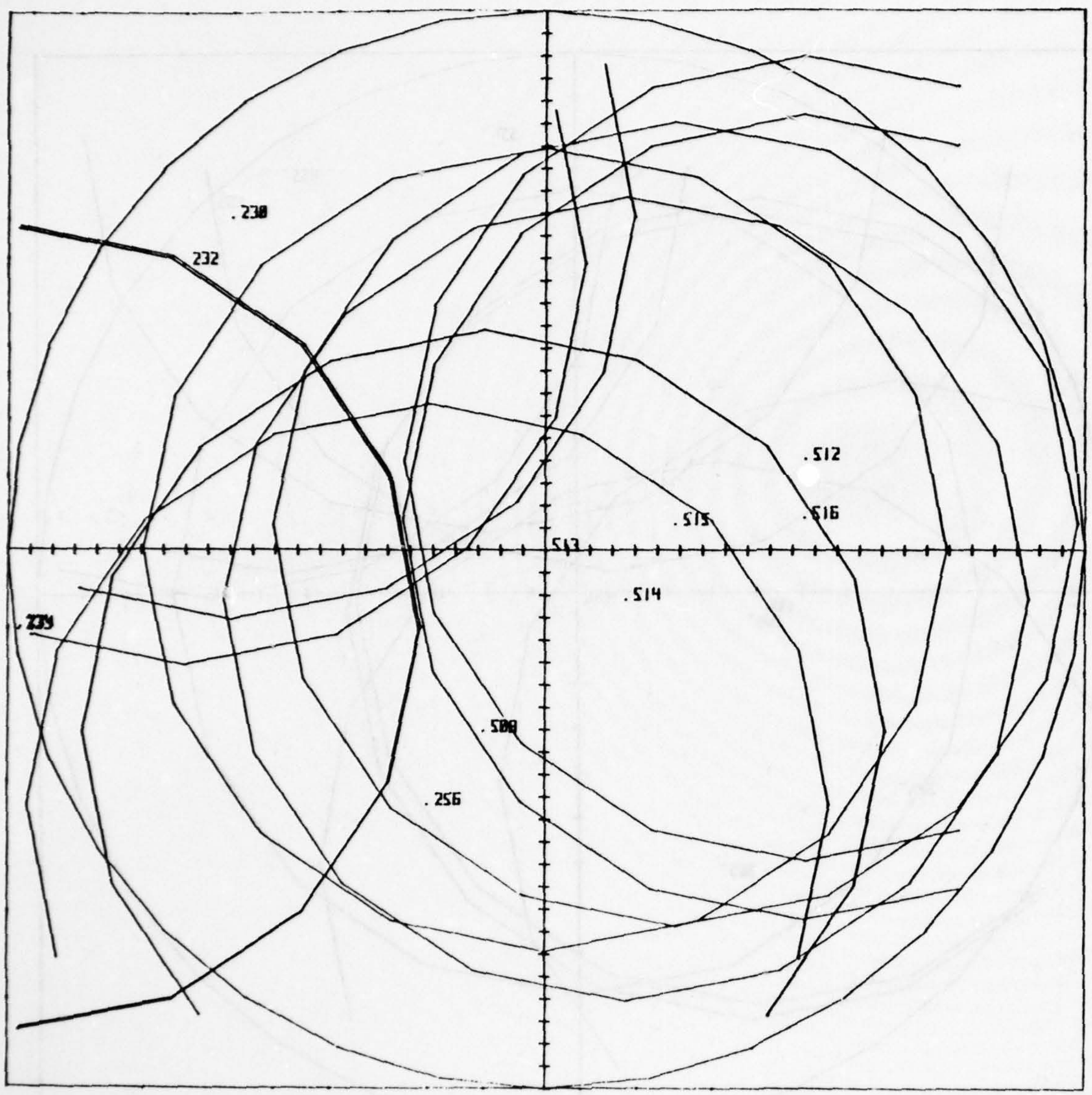
IGHT 1000 GIVES RADIUS 44.72135
ZE OF AREA RADIUS (NM)? 60

LL # 457 USED AS NOMINAL SITE

RADAR # 454 WITHIN 47.15618066
RADAR # 455 WITHIN 52.39544069
RADAR # 457 WITHIN 0 NM
RADAR # 485 WITHIN 41.75925881
RADAR # 492 WITHIN 19.38981656
RADAR # 493 WITHIN 20.27119725
RADAR # 506 WITHIN 34.1263823
RADAR # 558 WITHIN 56.92553758
RADAR # 563 WITHIN 59.90234811 NM
*** ***** ***** ***** *****

FFO

DAYTON, OHIO



HEIGHT 4000 GIVES RADIUS 89.44271
SIZE OF AREA RADIUS (NM) 120

FILE # 513 USED AS NOMINAL SITE

RADAR	# 230	WITHIN	141.51[illegible]	!
RADAR	# 23[illegible]	WITHIN	10[illegible]58227	!
RADAR	# 23[illegible]	WITHIN	116.[illegible]1183	!
RADAR	# 234	WITHIN	116.[illegible]6148	!
RADAR	# 256	WITHIN	62.[illegible]	!
RADAR	# 508	WITHIN	42.716189[illegible]	!
RADAR	# 509	WITHIN	42.71618392	!
RADAR	# 512	WITHIN	61.45065464	!
RADAR	# 513	WITHIN	0 NM	
RADAR	# 514	WITHIN	21.24841784	!
RADAR	# 515	WITHIN	29.5[illegible]453	!
RADAR	# 516	WITHIN	58.15[illegible]	!

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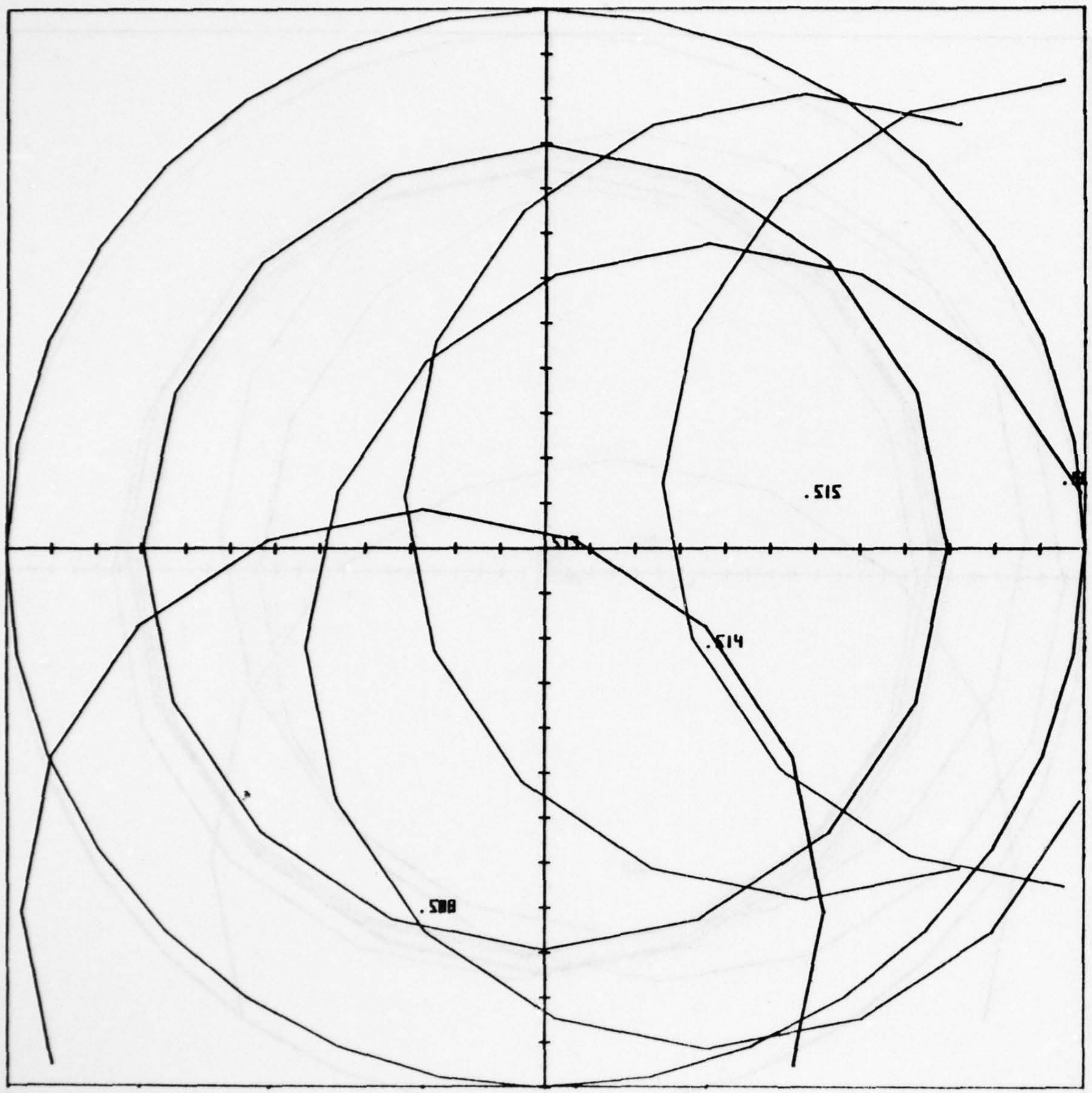
FFO

DAYTON, OHIO



35955

AREA (RADIUS (NM))

AREA (RADIUS (NM)) 60

FILE AS NOMINAL SITE?513

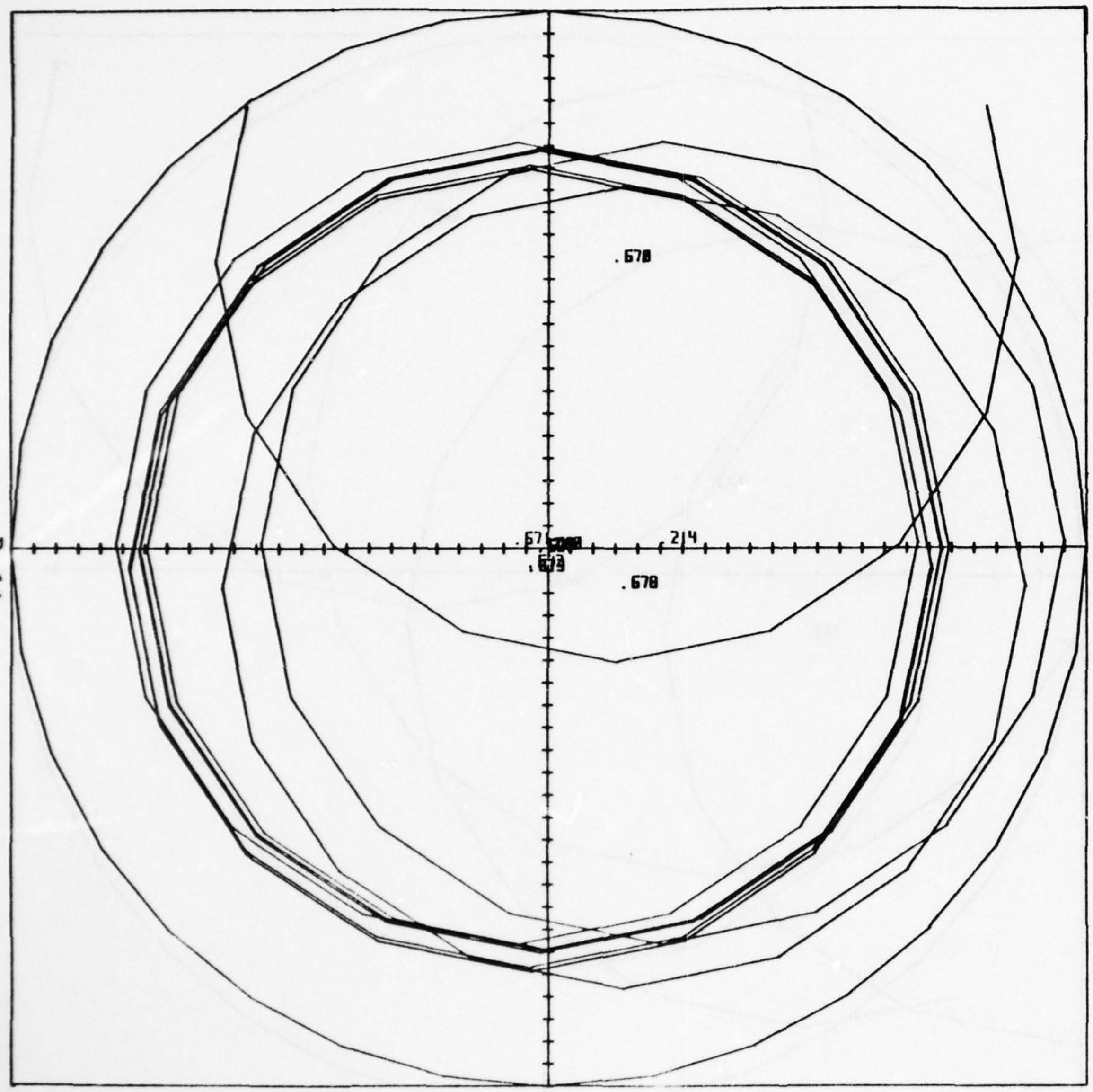
.3 USED AS NOMINAL SITE

508	WITHIN	42.71618392	NM
509	WITHIN	42.71618392	NM
RADAR # 513	WITHIN	0	NM
RADAR # 514	WITHIN	21.24841784	NM
RADAR # 515	WITHIN	29.57280453	NM
RADAR # 516	WITHIN	58.15853873	NM

***** ***** ***** *****

G E G

SPOKANE, WASH.



CNT 4000 GIVES RADIUS 89.44271
E OF AREA RADIUS (NM) 120

E # 680 USED AS NOMINAL SITE

RADAR #	214	WITHIN	25.59685522	
RADAR #	670	WITHIN	65.88583249	
RADAR #	671	WITHIN	7.06020054	
RADAR #	672	WITHIN	5.65698143	
RADAR #	673	WITHIN	6.21748074	
RADAR #	678	WITHIN	18.99658349	
RADAR #	679	WITHIN	1.606418327	
RADAR #	680	WITHIN	0	NM
RADAR #	681	WITHIN	1.90307711	

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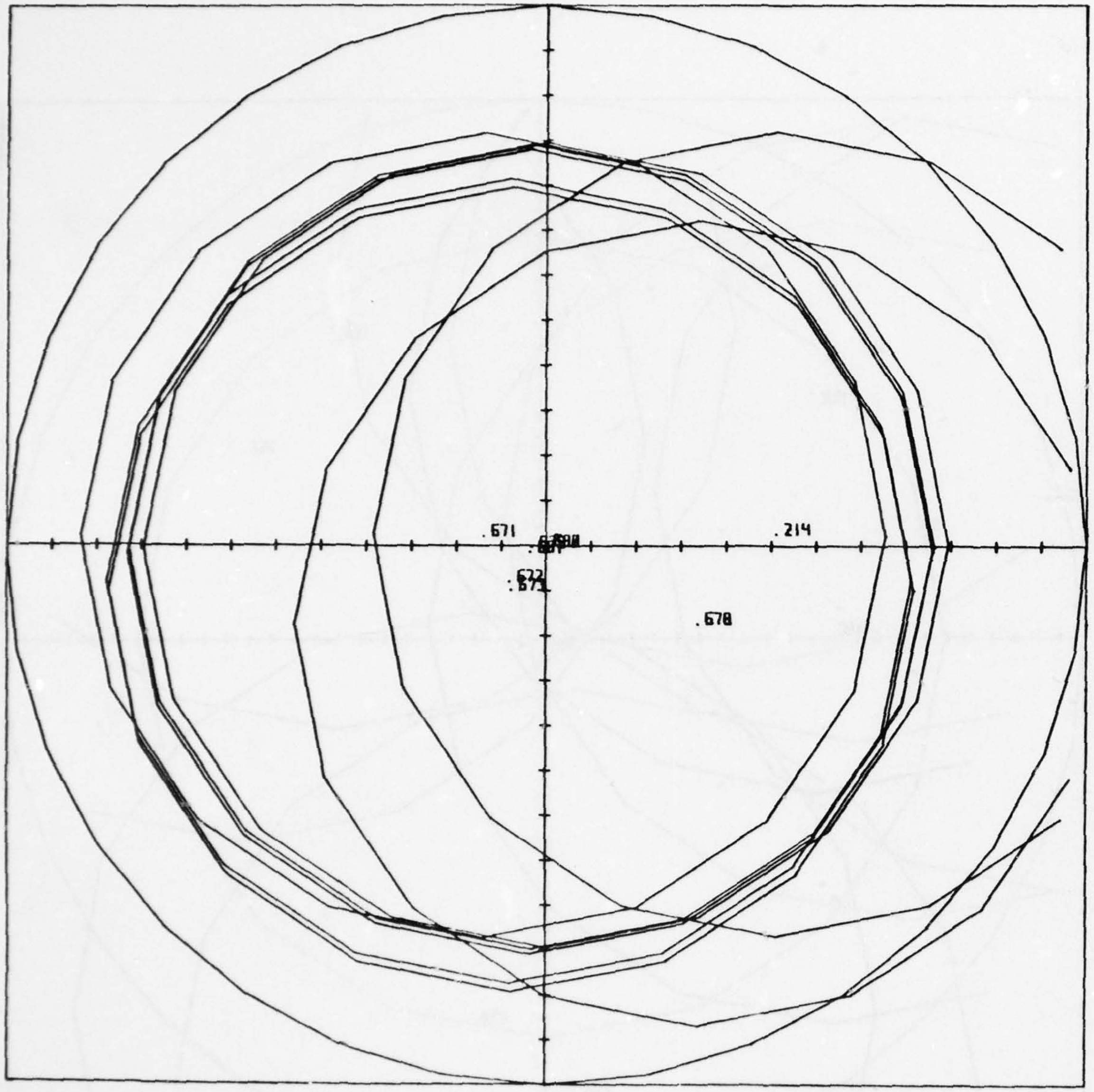
G E G

SPOKANE, WASH.



D 1000 GIVES RADIUS 44.721359
OF AREA RADIUS (NM) 60

\# 680 USED AS NOMINAL SITE

RADAR # 214 WITHIN 5.5[illegible]22
RADAR # 671 WITHIN 7.06[illegible]54
RADAR # 672 WITHIN 5.6569[illegible]
RADAR # 673 WITHIN 6.217348874
RADAR # 678 WITHIN 18.99[illegible]
RADAR # 679 WITHIN 1.60[illegible]41[illegible]27
RADAR # 680 WITHIN 0 NM
RADAR # 681 WITHIN 1.90[illegible]

***** ***** ***** *****

AD-A061 948 FEDERAL AVIATION ADMINISTRATION WASHINGTON D C OFFIC--ETC F/G 17/7
FAA BCAS CONCEPT. VOLUME IIIA. APPENDICES A-E,(U)
APR 78 E J KOENKE

UNCLASSIFIED FAA-EM-78-5-III-A NL

3 OF 5
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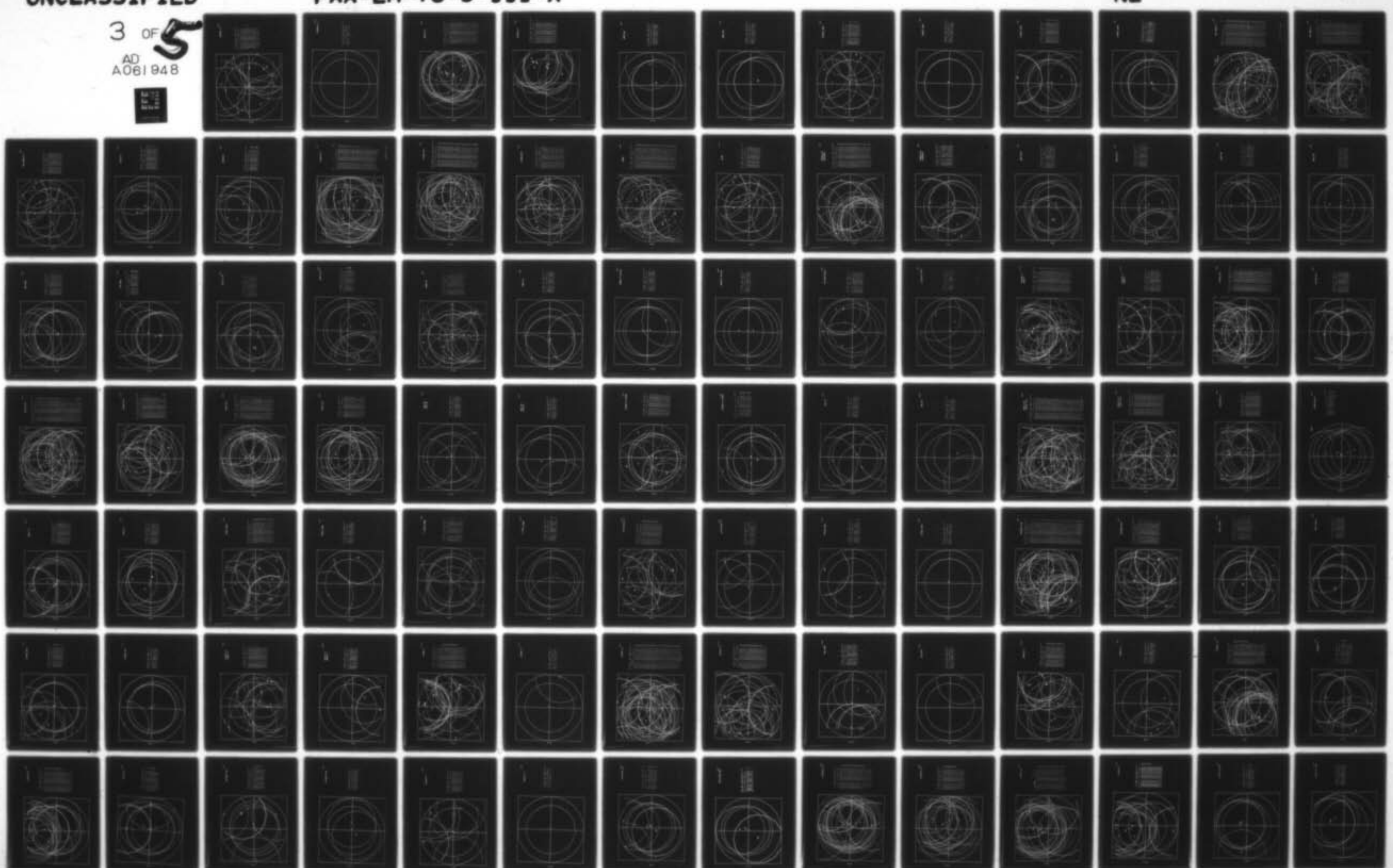
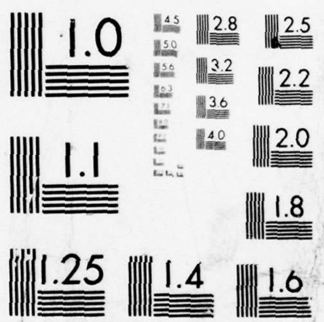
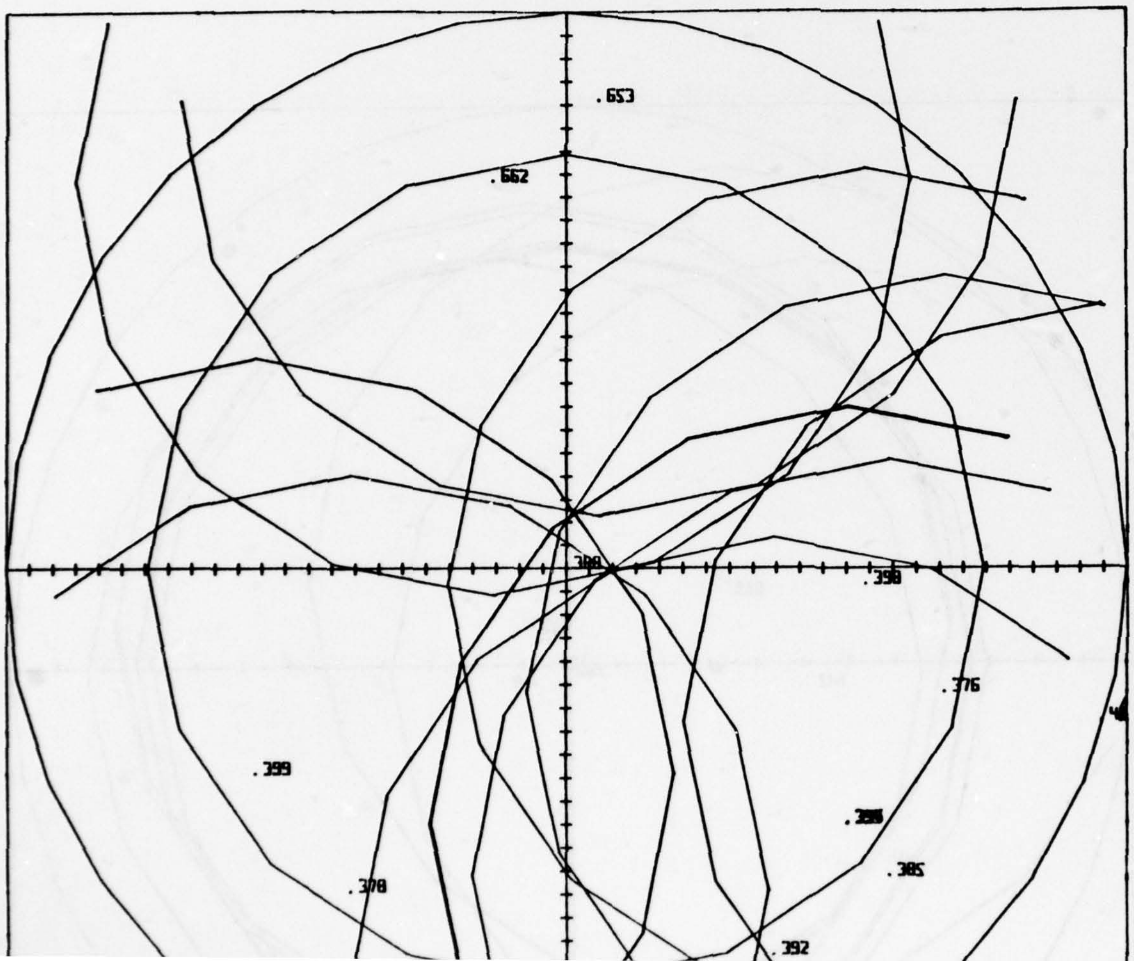
A061948




1.0
1.1
1.25
1.4
1.6
1.8
2.0
2.2
2.5
2.8
3.2
3.6
4.0
4.5
5.0
5.6

G S O
GREENSBORO, N. C.




```
IGHT 4000     GIVES RADIUS 89.4427
ZE OF AREA (RADIUS (NM)) 120

TILL # 388  USED AS NOMINAL SITE

  RADAR # 376   WITHIN 85.29553962
  RADAR # 378   WITHIN 83.10626269
  RADAR # 385   WITHIN 95.66266435
  RADAR # 388   WITHIN 0     NM
  RADAR # 392   WITHIN 94.00684025
  RADAR # 393   WITHIN 79.58543113   ....
  RADAR # 394   WITHIN 79.58543113   NM
  RADAR # 395   WITHIN 81.30143169
  RADAR # 396   WITHIN 81.32016549
   RADAR # 397  WITHIN 81.30143169
   RADAR # 398  WITHIN 64.2739507
  RADAR # 400   WITHIN 119.2129676
  RADAR # 401   WITHIN 119.1910591
  RADAR # 653   WITHIN 101.1165453
  RADAR # 662   WITHIN 85.09139064
  ..   *****  *****  *****  *****
  IGHT 4000     GIVES RADIUS 89.442
  ZE OF AREA  RADIUS (NM)  120
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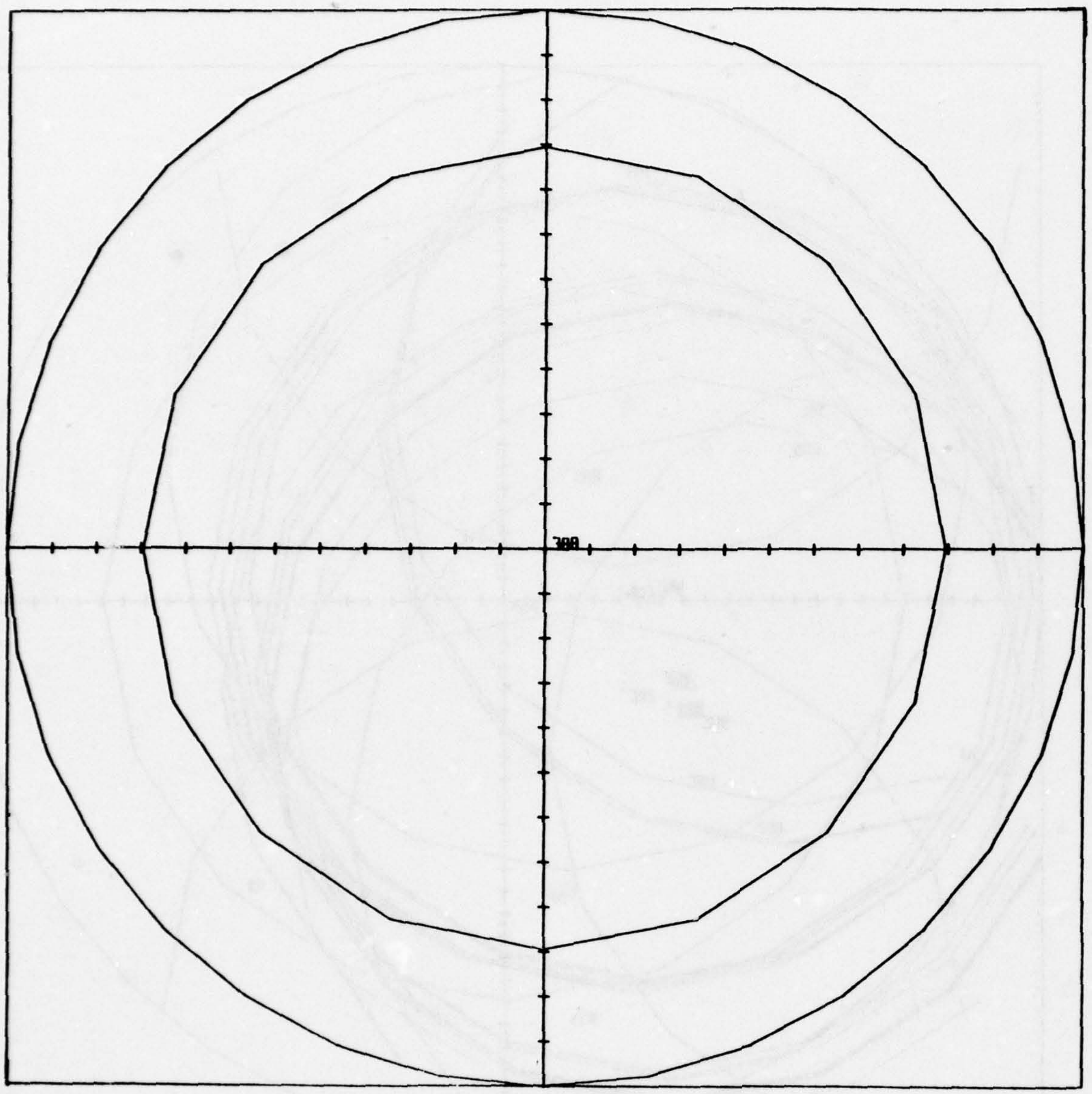
GSO

GREENSBORO, N. C.



IGHT 1000 GIVES RADIUS 44.72135
E OF AREA RADIUS (NM) 60

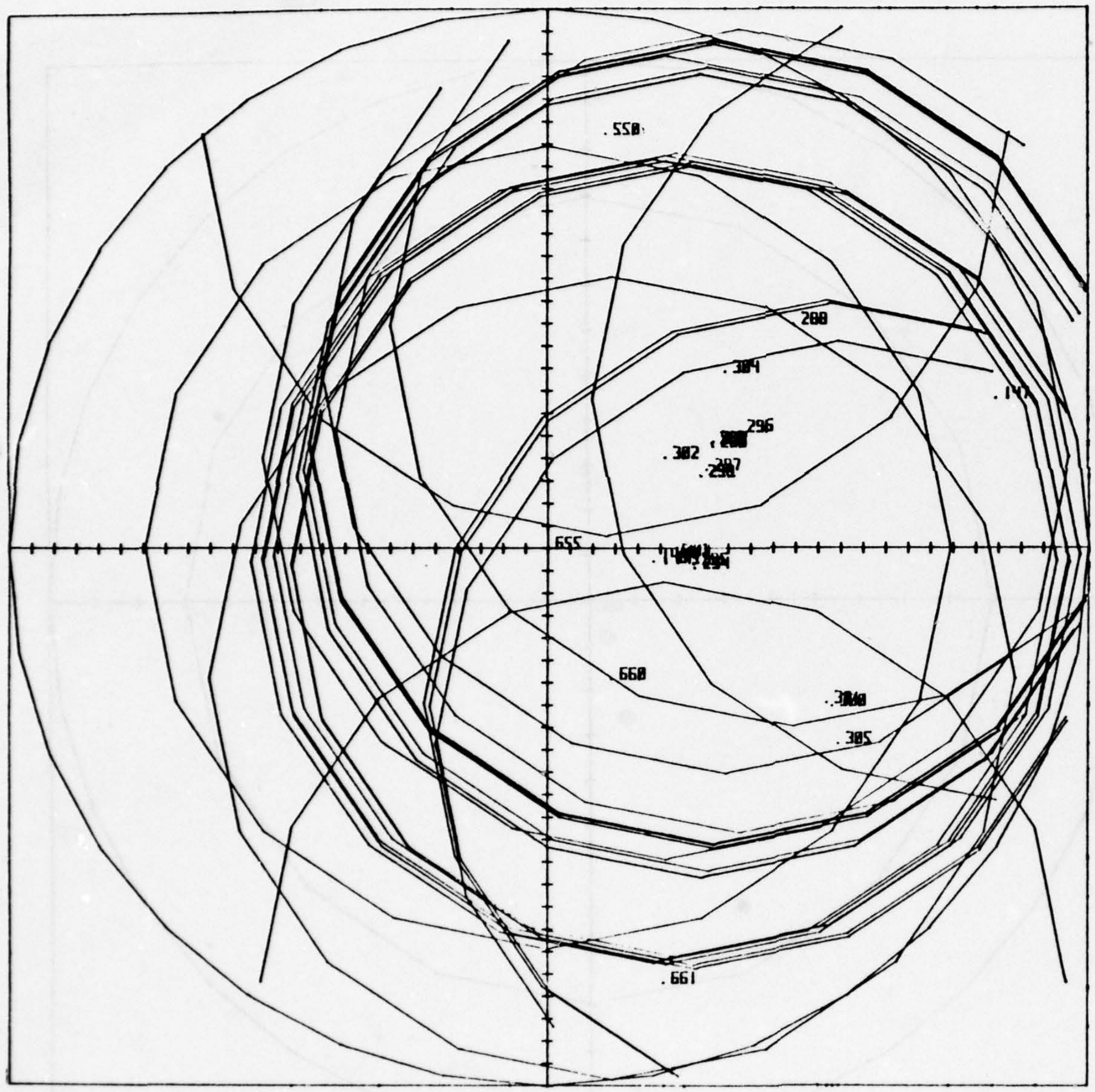
E # 388 USED AS NOMINAL SITE

RADAR # 388 WITHIN 0 NM

** ***** ***** ***** *****

I A D

WASH DULLES, VA.



HEIGHT 4000 GIVEN RADIUS 89.44271
SIZE OF AREA RADIUS (NM) 120

SITE # 655 USED AS NOMINAL SITE

RADAR	# 144	WITHIN	26.13021754	I
RADAR	# 145	WITHIN	26.46504620	I
RADAR	# 146	WITHIN	23.70445095	I
RADAR	# 147	WITHIN	104.930989.	I
RADAR	# 288	WITHIN	73.81700061	I
RADAR	# 289	WITHIN	43.42984914	I
RADAR	# 290	WITHIN	43.15853177	I
RADAR	# 291	WITHIN	43.42984914	I
RADAR	# 292	WITHIN	43.03802324	I
RADAR	# 293	WITHIN	43.42984914	I
RADAR	# 294	WITHIN	32.97461410	
RADAR	# 295	WITHIN	32.63196624	
RADAR	# 296	WITHIN	49.53950969	
RADAR	# 297	WITHIN	39.55790107	
RADAR	# 298	WITHIN	37.58476513	
RADAR	# 299	WITHIN	37.58476513	
RADAR	# 300	WITHIN	32.40479267	
RADAR	# 301	WITHIN	30.95818761	
RADAR	# 302	WITHIN	33.06408773	
RADAR	# 303	WITHIN	28.65377329	
RADAR	# 304	WITHIN	55.62009437	
RADAR	# 305	WITHIN	27.88610888	
RADAR	# 550	WITHIN	93.03544889	
RADAR	# 655	WITHIN	0 NM	
RADAR	# 660	WITHIN	32.48143110	
RADAR	# 661	WITHIN	100.3254536	

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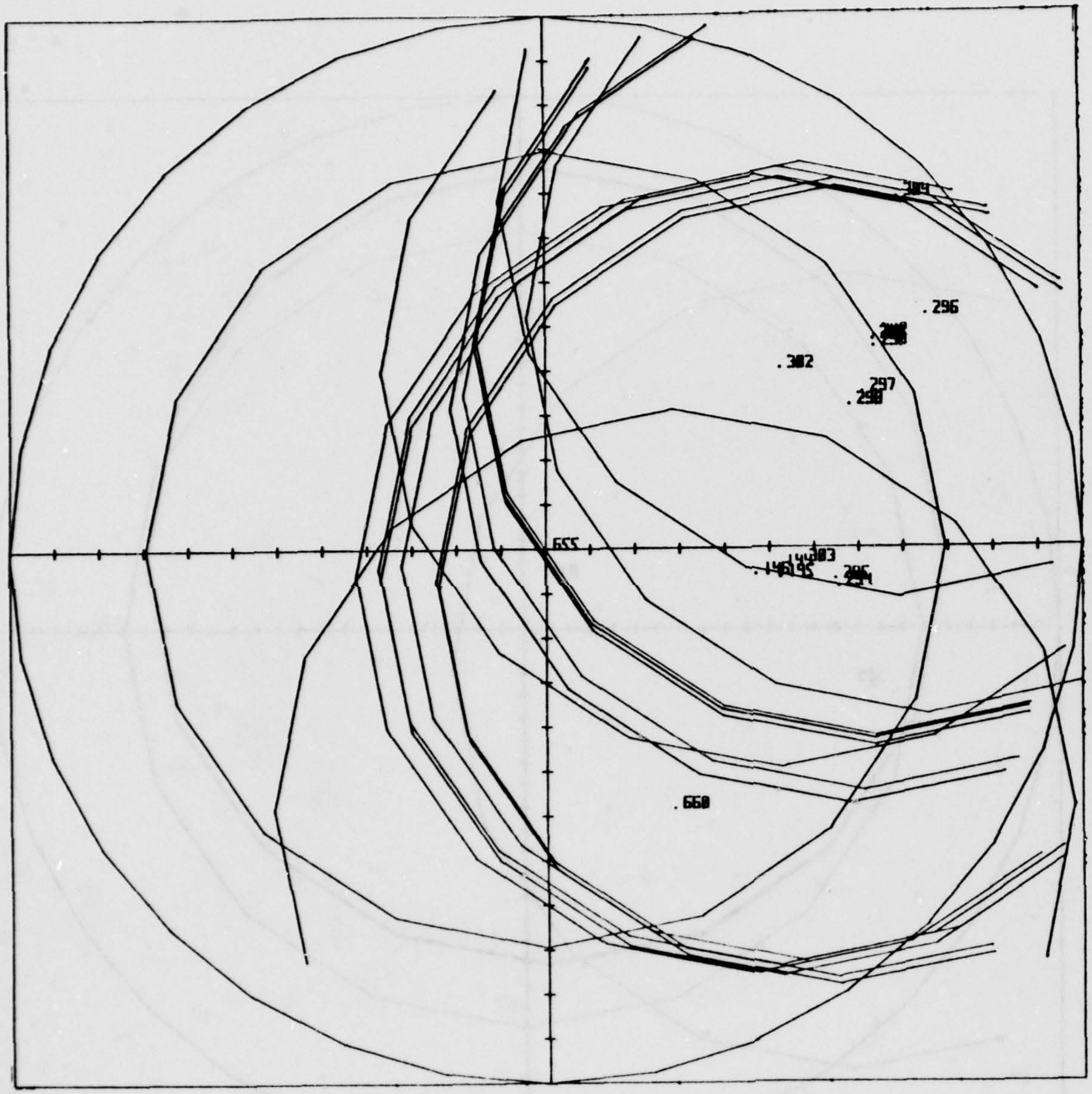
IAD

WASH DULLES, VA.



FIGHT 1000 GIVES RADIUS 44.72135955
IZE OF AREA (RADIUS (NM)) 60

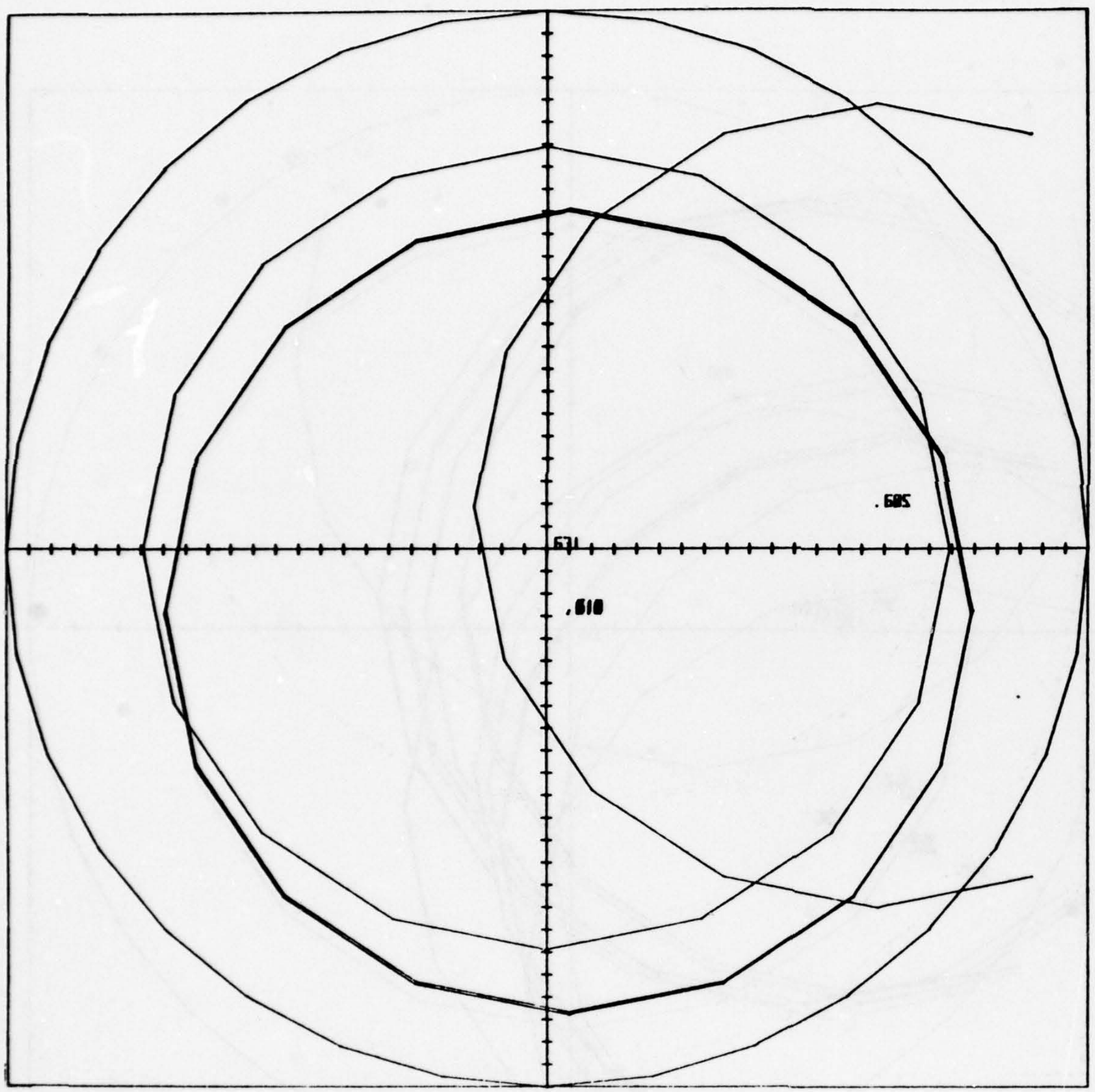
ITE # 655 USED AS NOMINAL SITE

RADAR # 144	WITHIN	26.13021754	
RADAR # 145	WITHIN	26.46509620	
RADAR # 146	WITHIN	23.70445095	
RADAR # 289	WITHIN	43.42984914	
RADAR # 290	WITHIN	43.15853177	
RADAR # 291	WITHIN	43.42984914	
RADAR # 292	WITHIN	43.83802324	
RADAR # 293	WITHIN	43.42984914	
RADAR # 294	WITHIN	32.97461410	
RADAR # 295	WITHIN	32.63198629	
RADAR # 296	WITHIN	49.93950969	
RADAR # 297	WITHIN	39.55790107	
RADAR # 298	WITHIN	37.58476513	
RADAR # 299	WITHIN	37.58476513	
RADAR # 302	WITHIN	33.06408773	
RADAR # 303	WITHIN	26.65377329	
RADAR # 304	WITHIN	55.62809437	
RADAR # 655	WITHIN	0	NM
RADAR # 660	WITHIN	32.48143110	

***** ***** ***** ***** *****

I A H

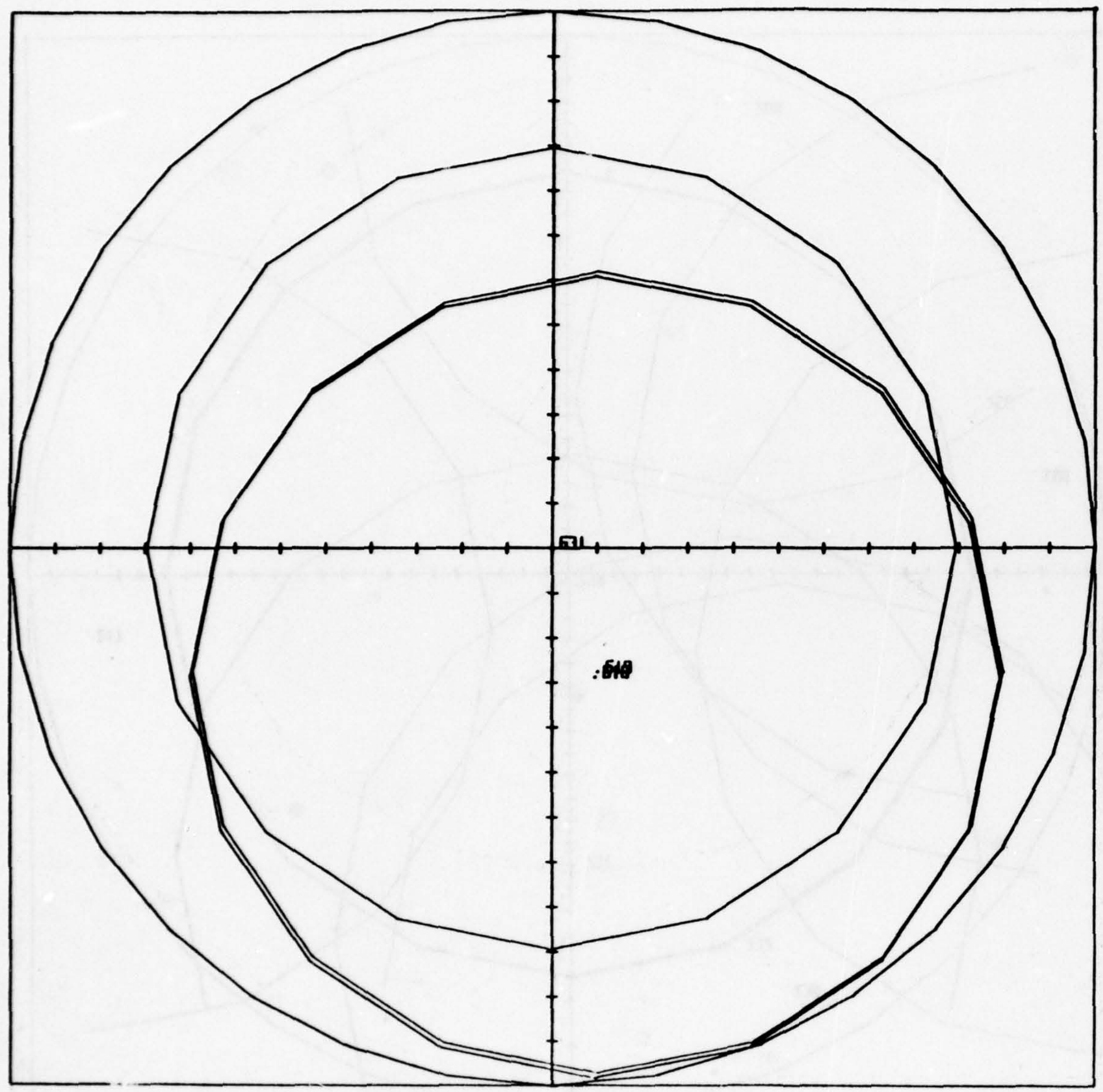
HOUSTON, TEXAS



HEIGHT 4000 GIVES RADIUS 89.44271
, SIZE OF AREA (RADIUS (NM)) 120

FILE # 631 USED AS NOMINAL SITE

RADAR # 605 WITHIN 73.9938341
RADAR # 618 WITHIN 15.2072879
RADAR # 619 WITHIN 14.76700465
RADAR # 631 WITHIN 0 NM
***** ***** ***** ***** *****



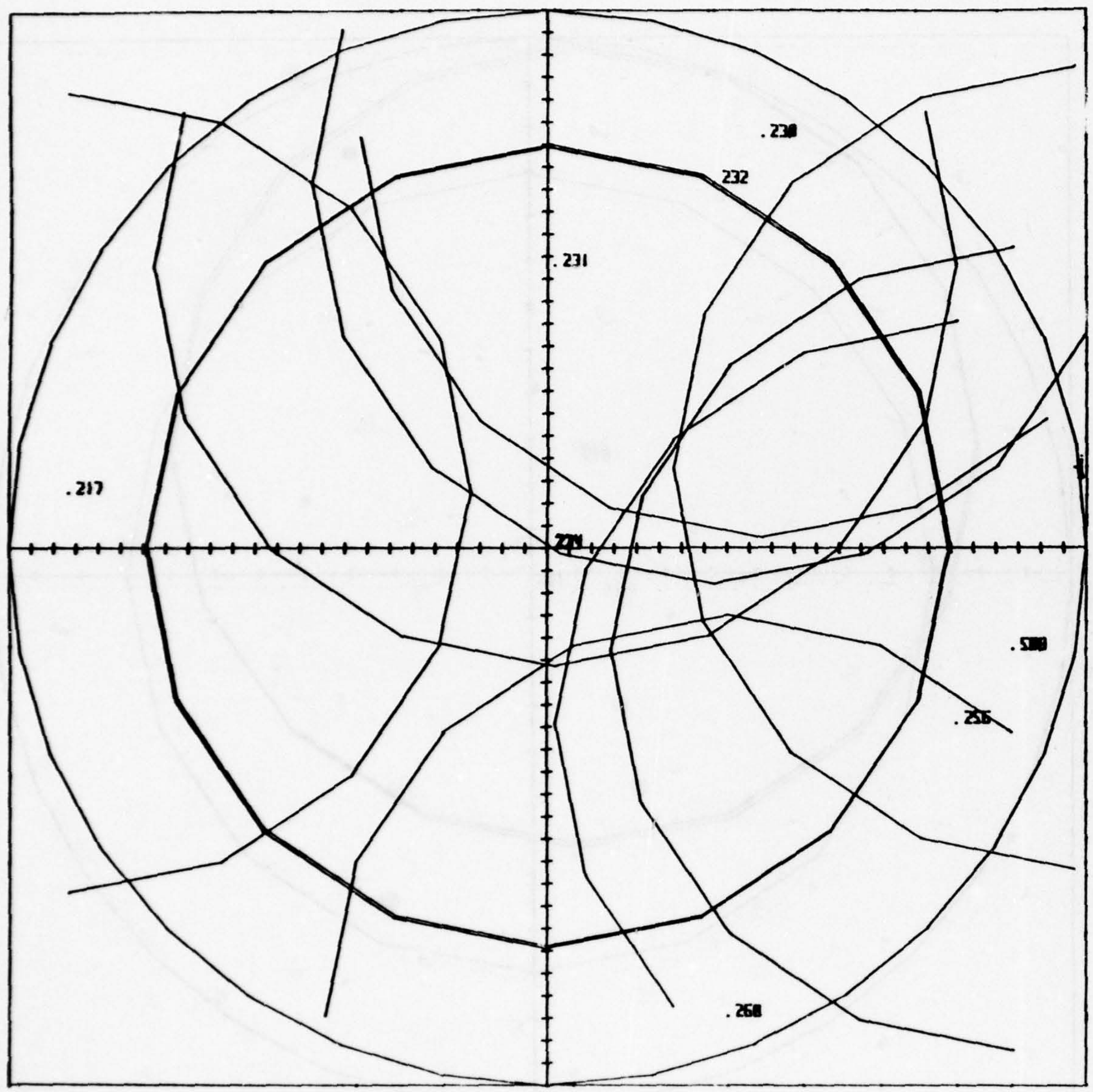
I A H

HOUSTON, TEXAS

IGHT 1000 GIVES RADIUS 44.721359
'E OF AREA (RADIUS (NM)) 60

.E # 631 USED AS NOMINAL SITE

'ADAR # 618 WITHIN 15.2072879
'ADAR # 619 WITHIN 14.76700465
'ADAR # 631 WITHIN 0 NM
** ***** ***** ***** *****



I N D

INDIANAPOLIS, INDIANA

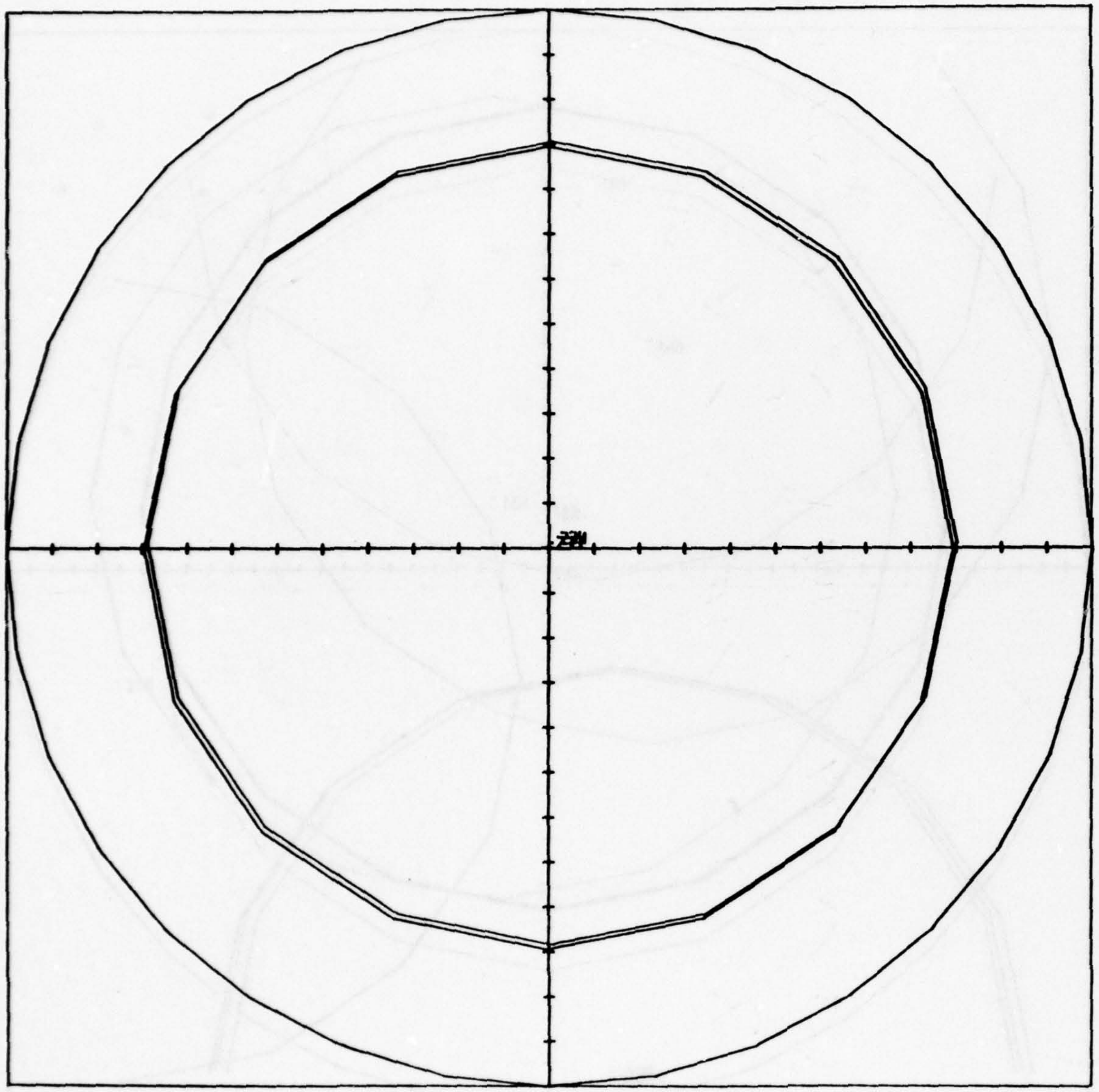
```
HEIGHT 4000    GIVES RADIUS 89.44271
SIZE OF AREA (RADIUS (NM)) 120

FILE # 233  USED AS NOMINAL SITE

  RADAR # 217  WITHIN 107.3795603   I
  RADAR # 230  WITHIN 103.5051786   I
  RADAR # 231  WITHIN 63.0661605    N
  RADAR # 232  WITHIN 89.5335?644   N
  RADAR # 233  WITHIN 0    NM
  RADAR # 234  WITHIN 0.68999157    N
  RADAR # 256  WITHIN 99.3662412    N
  RADAR # 260  WITHIN 111.9122610   N
  RADAR # 508  WITHIN 106.2216282   N
  RADAR # 509  WITHIN 106.2216282   N
  RADAR # 513  WITHIN 118.821183    N
*****  *****  *****  *****  *****
```

IND

INDIANAPOLIS, INDIANA



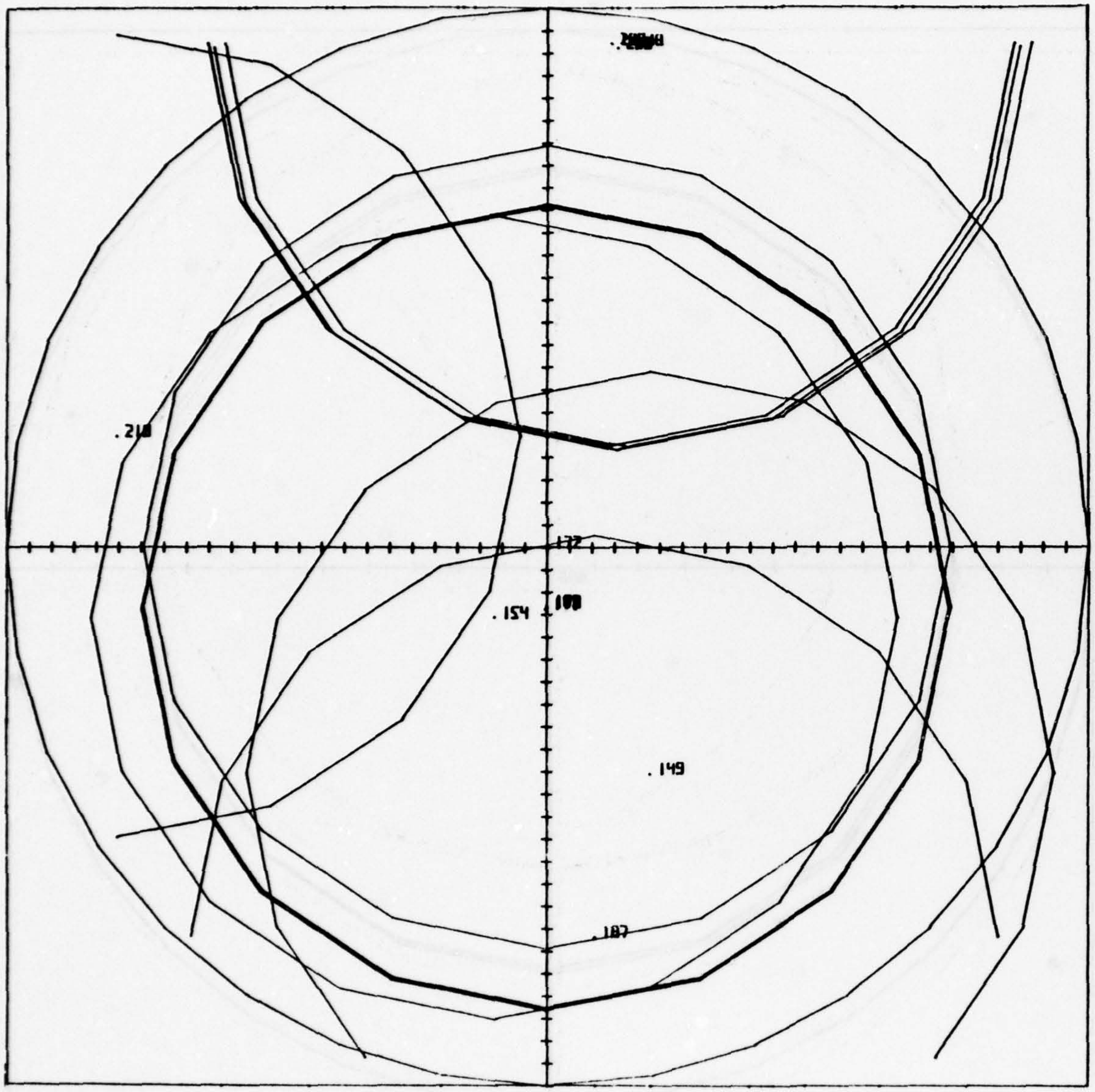
GHT 1000 GIVES RADIUS 44.72135
E OF AREA RADIUS (NM) 60

E # 233 USED AS NOMINAL SITE

RADAR # 233 WITHIN 0 NM
RADAR # 234 WITHIN 0.689998157
*** ***** ***** ***** *****

JAX

JACKSONVILLE, FLORIDA




```
HEIGHT 4000    GIVES RADIUS 84.442719
SIZE OF AREA (RADIUS (NM)) 120

FILE # 172  USED AS NOMINAL SITE

  RADAR # 149  WITHIN 55.37120880   N
  RADAR # 154  WITHIN 19.55393205   N
  RADAR # 169  WITHIN 12.99190497   N
  RADAR # 170  WITHIN 13.34486804   N
  RADAR # 171  WITHIN 13.70164573   N
  RADAR # 172  WITHIN 0    NM
  RADAR # 187  WITHIN 87.40457879   N
  RADAR # 197  WITHIN 112.892491    N
  RADAR # 205  WITHIN 112.892491    N
  RADAR # 206  WITHIN 112.1957044   N
  RADAR # 208  WITHIN 113.2978608   N
  RADAR # 210  WITHIN 90.54990275   N
 *****  *****  *****  *****  *****
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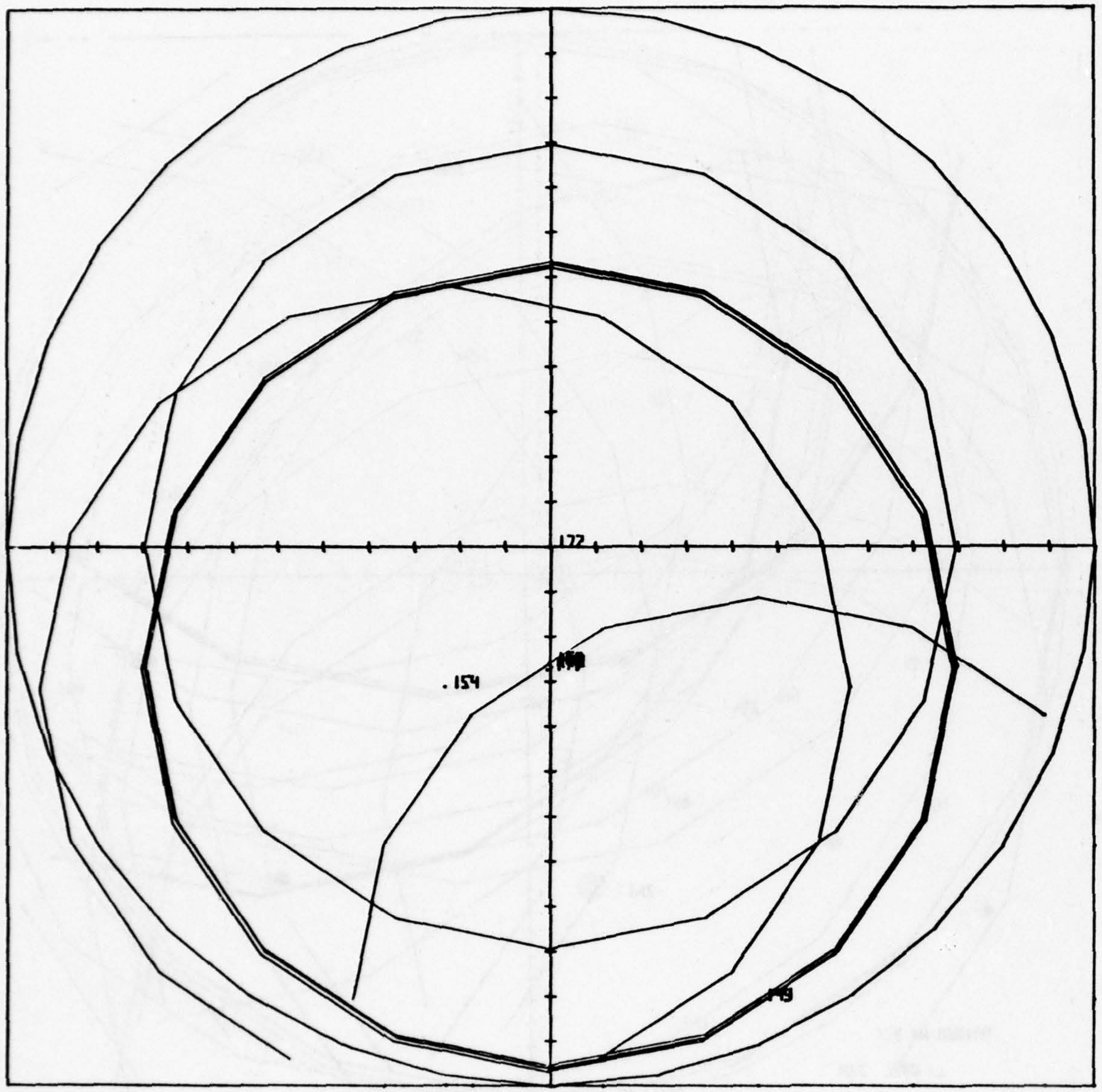
JAX

JACKSONVILLE, FLORIDA



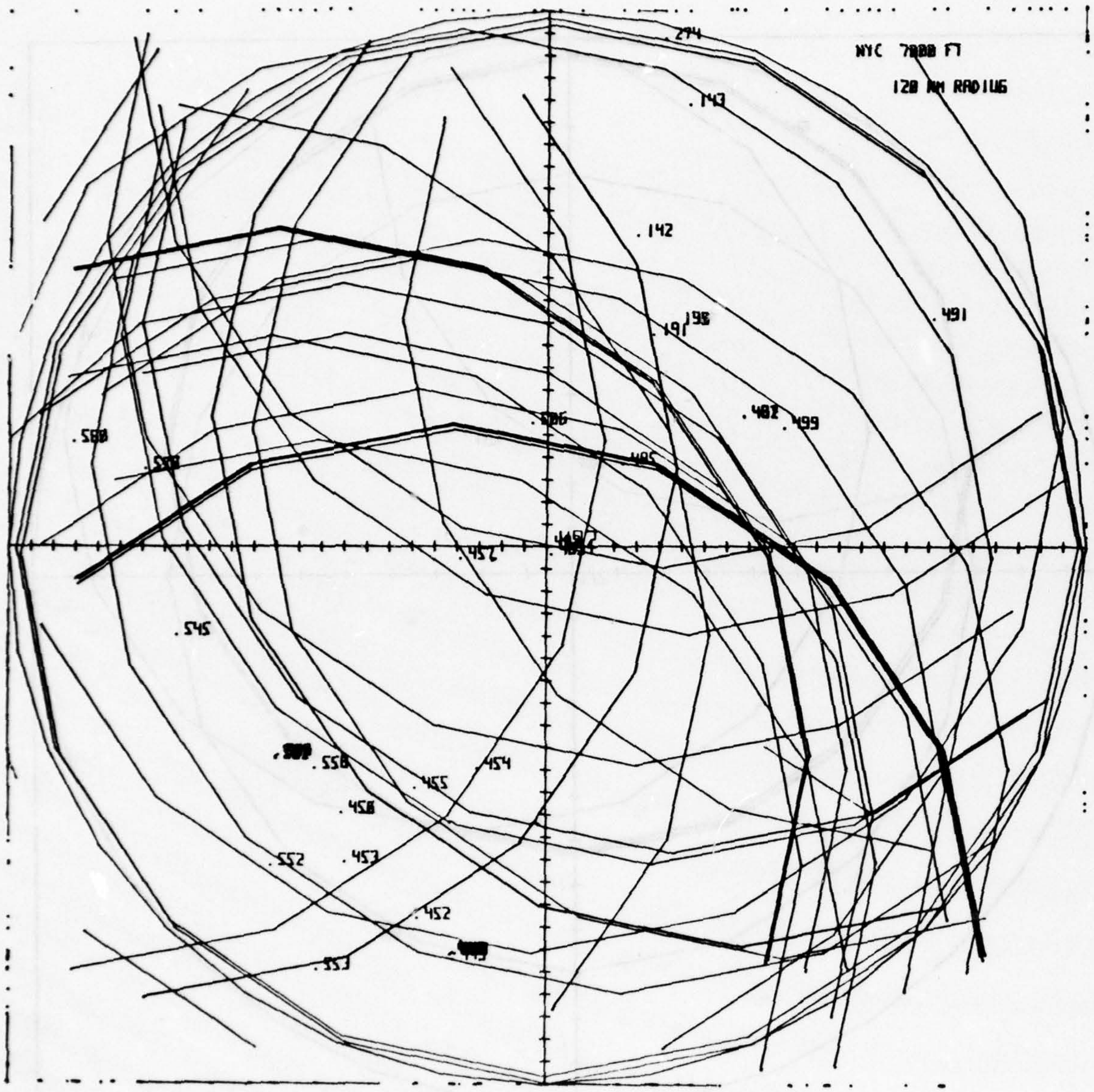

```
 IGHT 1000     GIVES RADIUS 44.7213
 ZE OF AREA (RADIUS (NM)) 60

 LE # 172  USED AS NOMINAL SITE

RADAR # 149  WITHIN 55.37120880
RADAR # 154  WITHIN 14.55393205
RADAR # 169  WITHIN 12.99190497
RADAR # 170  WITHIN 13.34486804
RADAR # 171  WITHIN 13.70164573
RADAR # 172  WITHIN 0     NM
**  *****  *****  *****  *****
```

JFK

JOHN F. KENNEDY, N. Y. C.



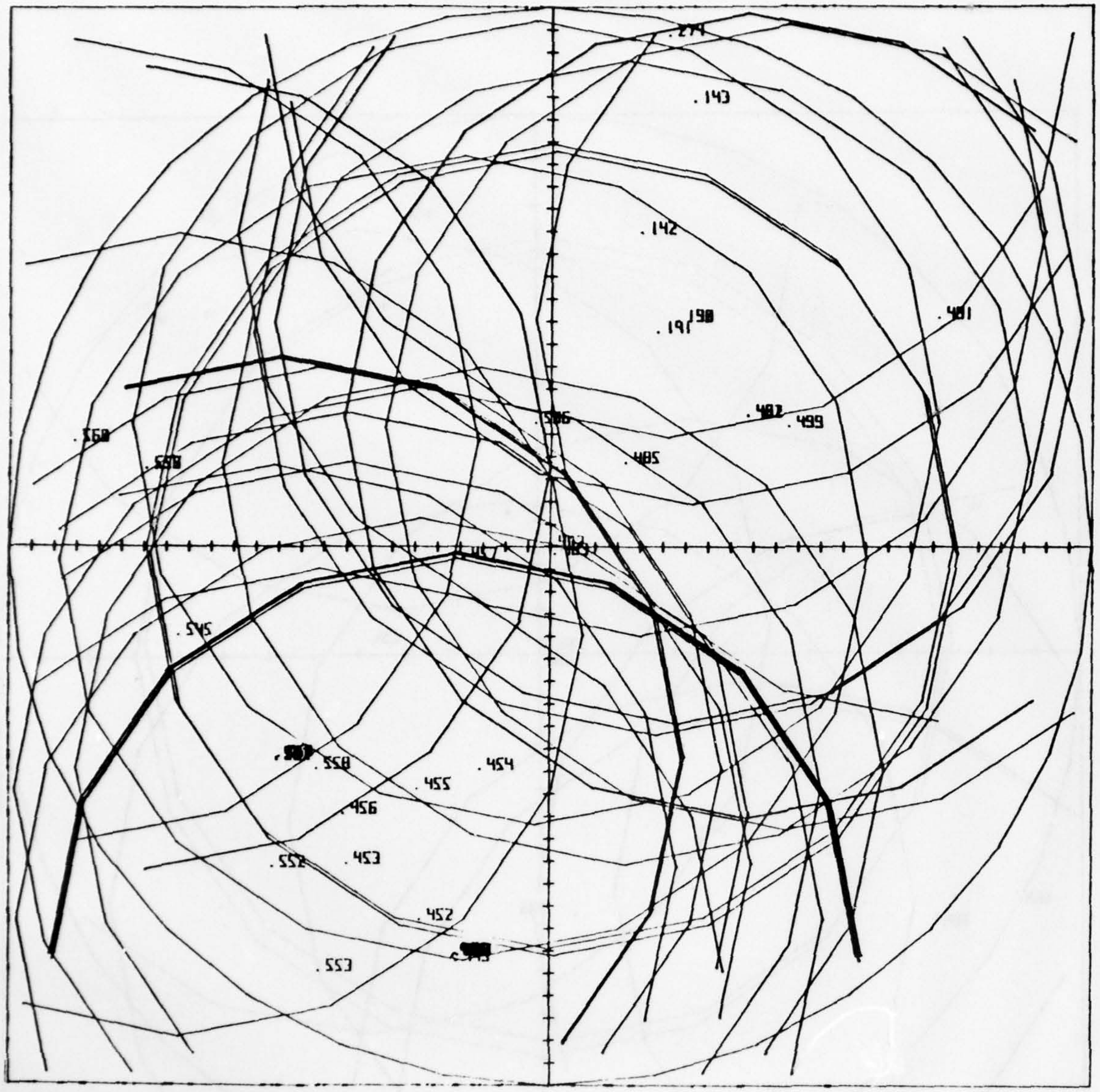
HEIGHT 5957

SIZE OF AREA (RADIUS (NM) =120.

FILE # 492 USED AS NOMINAL SITE

1	RADAR #	139	WITHIN	57.56110066	NM
2	RADAR #	140	WITHIN	57.56110066	NM
3	RADAR #	141	WITHIN	58.15924510	NM
4	RADAR #	142	WITHIN	72.44171203	NM
5	RADAR #	143	WITHIN	103.8071919	NM
6	RADAR #	274	WITHIN	116.6958817	NM
7	RADAR #	446	WITHIN	93.12967021	NM
8	RADAR #	447	WITHIN	93.58136276	NM
9	RADAR #	448	WITHIN	92.97570454	NM
10	RADAR #	449	WITHIN	94.41745634	NM
11	RADAR #	450	WITHIN	93.12967021	NM
12	RADAR #	451	WITHIN	93.13759976	NM
13	RADAR #	452	WITHIN	87.9663397	NM
14	RADAR #	453	WITHIN	83.6097205	NM
15	RADAR #	454	WITHIN	51.96370544	NM
16	RADAR #	455	WITHIN	61.45007838	NM
17	RADAR #	456	WITHIN	74.9291175	NM
18	RADAR #	457	WITHIN	19.38981656	NM
19	RADAR #	481	WITHIN	52.5573939	NM
20	RADAR #	482	WITHIN	52.49979564	NM
21	RADAR #	485	WITHIN	25.04849008	NM
22	RADAR #	491	WITHIN	99.89296667	NM
23	RADAR #	492	WITHIN	0 NM	
24	RADAR #	493	WITHIN	1.911371026	NM
25	RADAR #	499	WITHIN	59.0883154	NM
26	RADAR #	506	WITHIN	27.76998[illegible]	NM
27	RADAR #	545	WITHIN	84.50579030	NM
28	RADAR #	552	WITHIN	94.01837479	NM
29	RADAR #	553	WITHIN	107.3152451	NM
30	RADAR #	555	WITHIN	91.18386265	NM
31	RADAR #	556	WITHIN	91.18386265	NM
32	RADAR #	557	WITHIN	91.18386265	NM
33	RADAR #	558	WITHIN	71.40657696	NM
34	RADAR #	560	WITHIN	108.[illegible]	NM
35	RADAR #	561	WITHIN	76.46353242	NM
36	RADAR #	562	WITHIN	76.[illegible]54864	NM
37	RADAR #	[illegible]	WITHIN	[illegible]	NM

120 NM = 36 Radars



JFK

JOHN F. KENNEDY, N. Y. C.

HEIGHT 4000   GIVES RADIUS 89.44271910
SIZE OF AREA RADIUS (NM) 120

FILE # 492 USED AS NOMINAL SITE

RADAR #	139	WITHIN	57.56110066	NM
RADAR #	140	WITHIN	57.56110066	!
RADAR #	141	WITHIN	53.15924510	!
RADAR #	142	WITHIN	72.44171203	!
RADAR #	143	WITHIN	103.8071919	!
RADAR #	274	WITHIN	116.6958817	!
RADAR #	446	WITHIN	93.12967021	!
RADAR #	447	WITHIN	93.53136276	!
RADAR #	448	WITHIN	42.9570454	!
RADAR #	449	WITHIN	94.41745634	!
RADAR #	450	WITHIN	93.12967021	!
RADAR #	451	WITHIN	93.13759976	!
RADAR #	452	WITHIN	87.9663397	!
RADAR #	453	WITHIN	83.6047205	!
RADAR #	454	WITHIN	51.96370544	!
RADAR #	455	WITHIN	61.45007808	!
RADAR #	456	WITHIN	24.9241175	!
RADAR #	457	WITHIN	19.38981656	!
RADAR #	481	WITHIN	52.5573939	
RADAR #	482	WITHIN	52.49979564	
RADAR #	485	WITHIN	25.04849008	
RADAR #	491	WITHIN	99.04296667	
RADAR #	492	WITHIN	0 NM	
RADAR #	493	WITHIN	1.911371876	
RADAR #	499	WITHIN	59.0063154	
RADAR #	506	WITHIN	27.76998263	
RADAR #	545	WITHIN	84.50539030	
RADAR #	552	WITHIN	94.01837479	
RADAR #	553	WITHIN	107.3157451	
RADAR #	555	WITHIN	91.18386265	
RADAR #	556	WITHIN	91.18386265	
RADAR #	557	WITHIN	91.18386265	
RADAR #	558	WITHIN	71.44652646	
RADAR #	560	WITHIN	103.1787665	
RADAR #	561	WITHIN	26.46353342	
RADAR #	562	WITHIN	26.46354464	
RADAR #	563	WITHIN	25.32460244	NM

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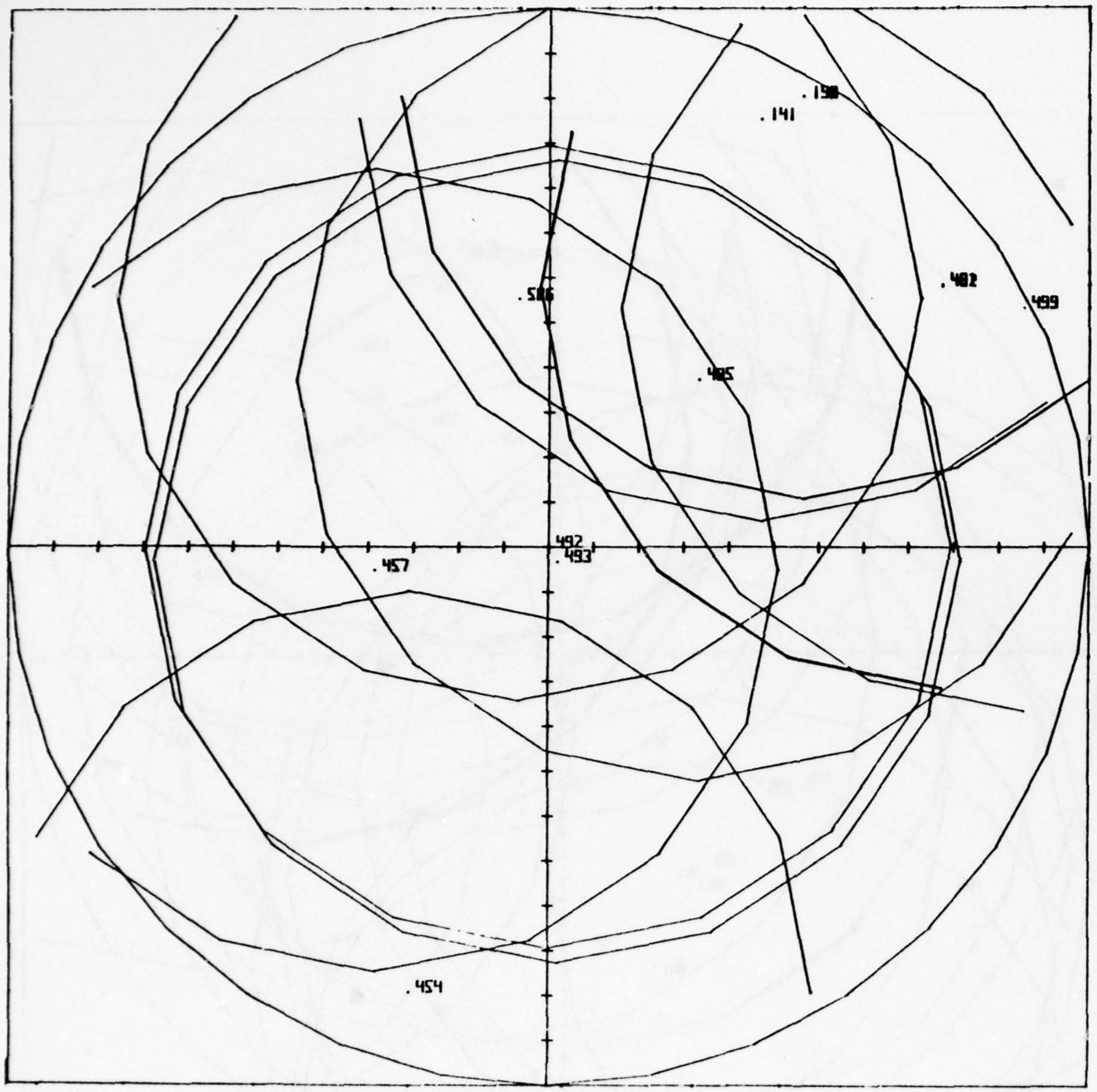
JFK

JOHN F. KENNEDY, N. Y. C.



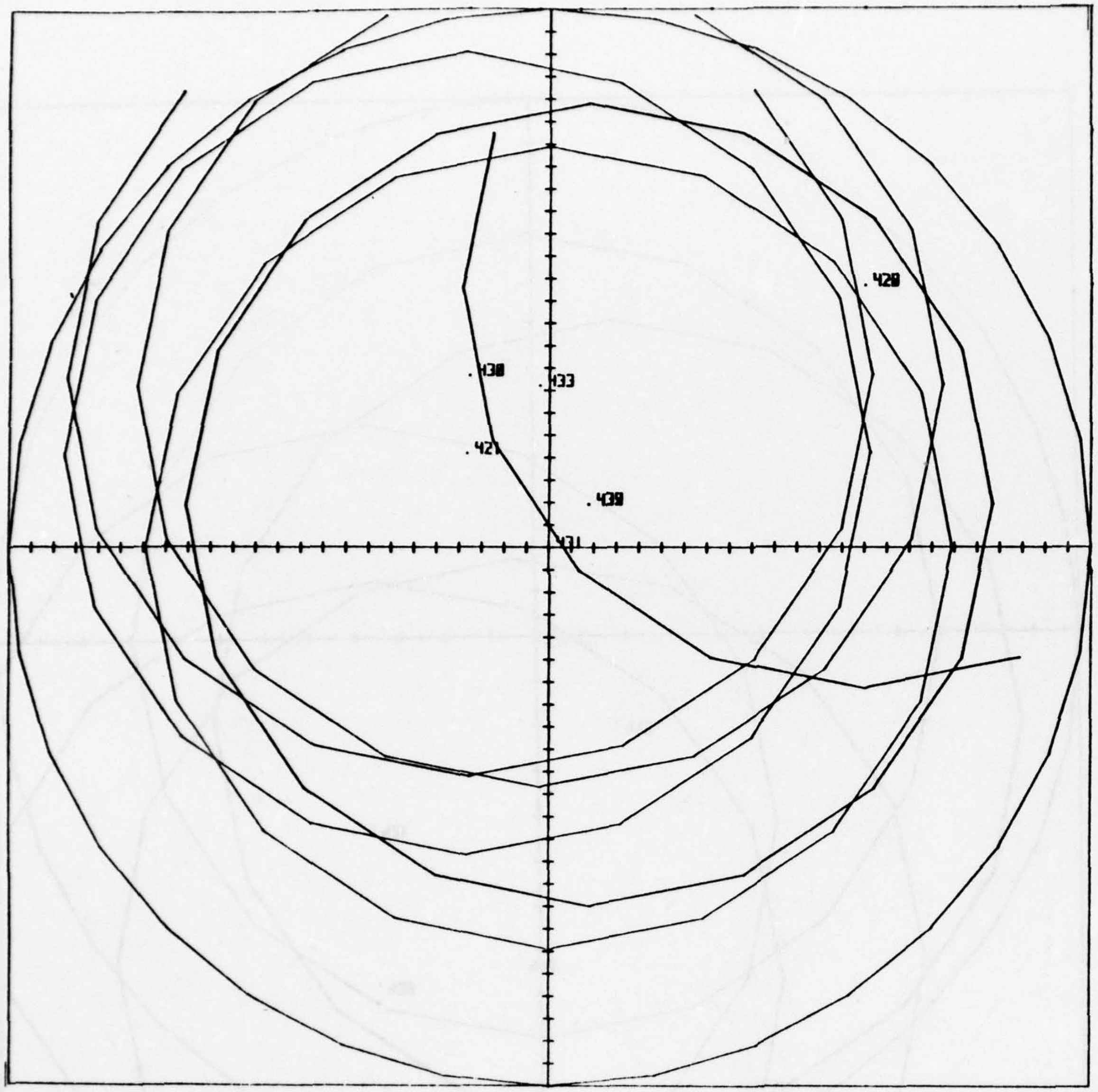
HEIGHT 1000 GIVES RADIUS 44.7213
SIZE OF AREA (RADIUS (NM)) 60

SITE # 492 USED AS NOMINAL SITE

RADAR	# 138	WITHIN	57.56110066
RADAR	# 140	WITHIN	57.56110066
RADAR	# 141	WITHIN	53.15924510
RADAR	# 454	WITHIN	51.56370544
RADAR	# 457	WITHIN	19.38981656
RADAR	# 481	WITHIN	52.55739?9
RADAR	# 482	WITHIN	52.49979564
RADAR	# 485	WITHIN	25.04849008
RADAR	# 492	WITHIN	0 NM
RADAR	# 493	WITHIN	1.91137182?
RADAR	# 499	WITHIN	54.0083154
RADAR	# 506	WITHIN	27.76998?83
***	*****	*****	***** *****

LAS

LAS VEGAS, NEV.



HEIGHT 4000   GIVES RADIUS 89.442719
SIZE OF AREA (RADIUS (NM)) 120

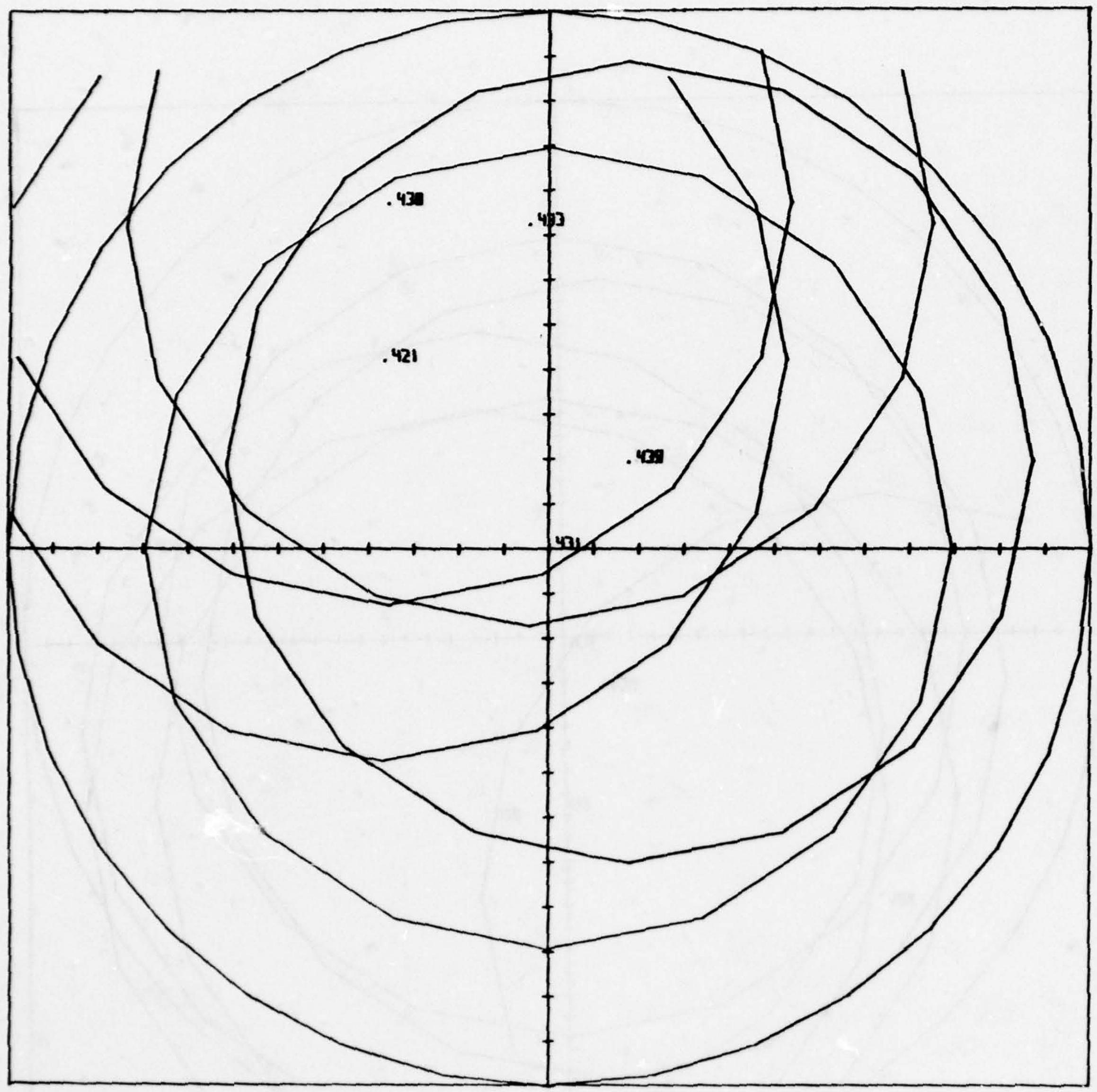
SITE # 431 USED AS NOMINAL SITE

RADAR	# 421	WITHIN	27.83756790	N
RADAR	# 424	WITHIN	91.00661115	N
RADAR	# 425	WITHIN	91.00661115	N
RADAR	# 426	WITHIN	91.00661115	N
RADAR	# 430	WITHIN	42.30972432	N
RADAR	# 431	WITHIN	0	NM
RADAR	# 432	WITHIN	13.10822802	N
RADAR	# 433	WITHIN	36.11976478	N
RADAR	# 434	WITHIN	13.10822802	N
RADAR	# 435	WITHIN	13.10822802	N

***** ***** ***** ***** *****

LAS

LAS VEGAS, NEV.

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IGHT 1000    GIVES RADIUS 44.7213595
IZE OF AREA (RADIUS (NM)) 60

ILE # 431  USED AS NOMINAL SITE

 RADAR # 421  WITHIN 27.83756790   NM
 RADAR # 430  WITHIN 42.30972432   NM
 RADAR # 431  WITHIN 0    NM
 RADAR # 432  WITHIN 13.10822802   NM
 RADAR # 433  WITHIN 36.11976478   NM
 RADAR # 434  WITHIN 13.10822802   NM
 RADAR # 435  WITHIN 13.10822802   NM
****  *****  *****  *****  *****
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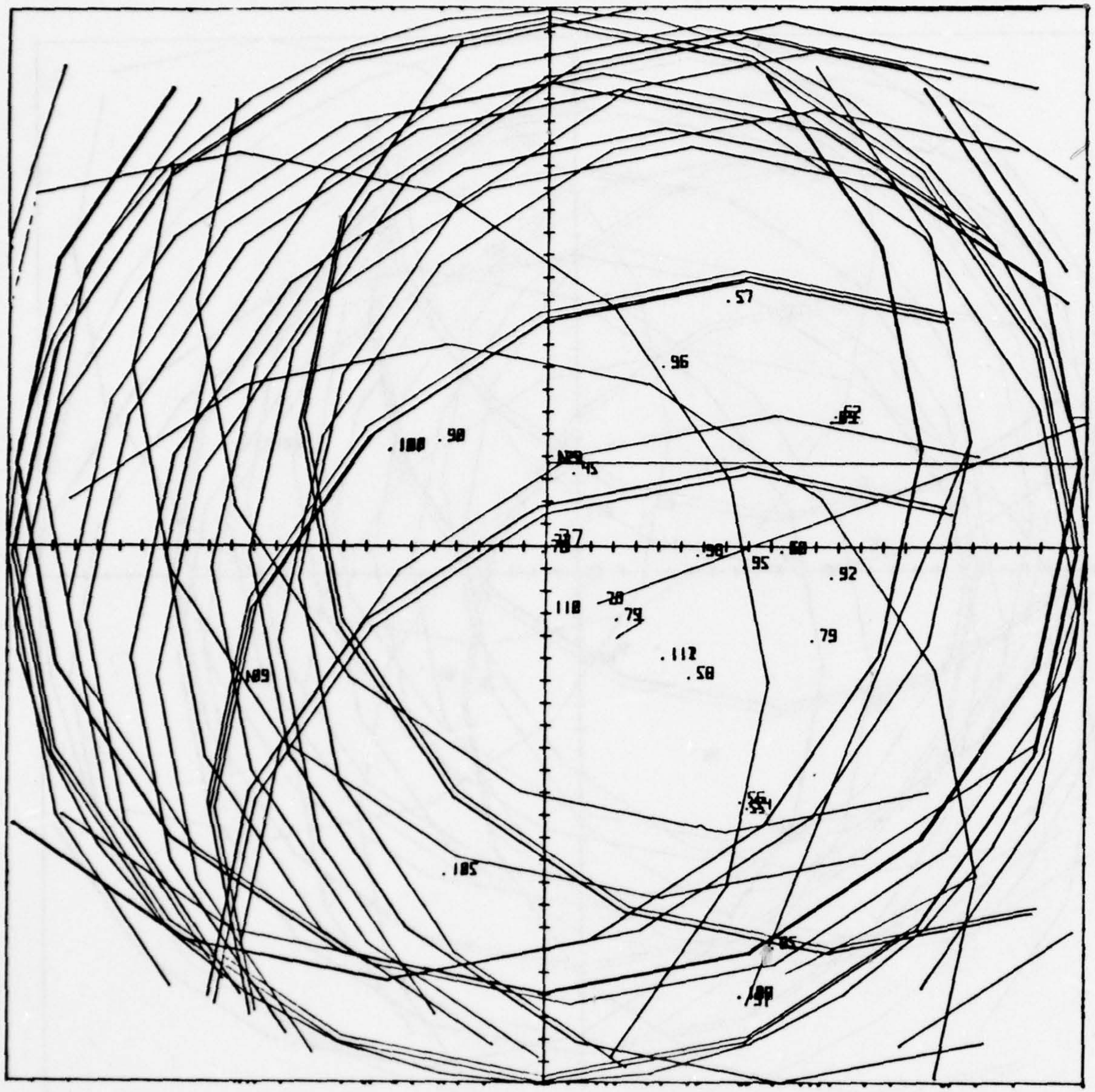
LAX

LOS ANGELES, CALIF.

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957

FILE # 77   USED AS NOMINAL SITE

RADAR # 45    WITHIN 17.25077250   NM
RADAR # 54    WITHIN 73.74448043   NM
RADAR # 55    WITHIN 73.7677375    NM
RADAR # 56    WITHIN 71.73813865   NM
RADAR # 57    WITHIN 67.53600596   NM
RADAR # 58    WITHIN 43.33289774   NM
RADAR # 59    WITHIN 52.43304730   NM
RADAR # 60    WITHIN 52.43304730   NM
RADAR # 62    WITHIN 70.30014078   NM
RADAR # 63    WITHIN 68.89122877   N
RADAR # 64    WITHIN 68.89122877   N
RADAR # 73    WITHIN 17.35084625   N
RADAR # 74    WITHIN 22.8158516    N
RADAR # 75    WITHIN 22.8158516    N
RADAR # 76    WITHIN 1.456358751   N
RADAR # 77    WITHIN 0     NM
RADAR # 79    WITHIN 62.74939986   N
RADAR # 85    WITHIN 102.7046966   N
RADAR # 90    WITHIN 35.69580253   N
RADAR # 91    WITHIN 111.5725267
RADAR # 92    WITHIN 67.90083633
RADAR # 95    WITHIN 44.22470619
RADAR # 96    WITHIN 47.44985692
RADAR # 98    WITHIN 33.81232818
RADAR # 100   WITHIN 41.02819033
RADAR # 101   WITHIN 41.14103636
RADAR # 105   WITHIN 76.67079292
RADAR # 106   WITHIN 104.498412
RADAR # 107   WITHIN 104.498412
RADAR # 108   WITHIN 104.498412
RADAR # 109   WITHIN 25.22420769
RADAR # 110   WITHIN 14.80975882
RADAR # 111   WITHIN 36.16432179
RADAR # 112   WITHIN 36.16432179
RADAR # 123   WITHIN 13.06401627
RADAR                18.44623081
RADAR                        308
.....                        ***
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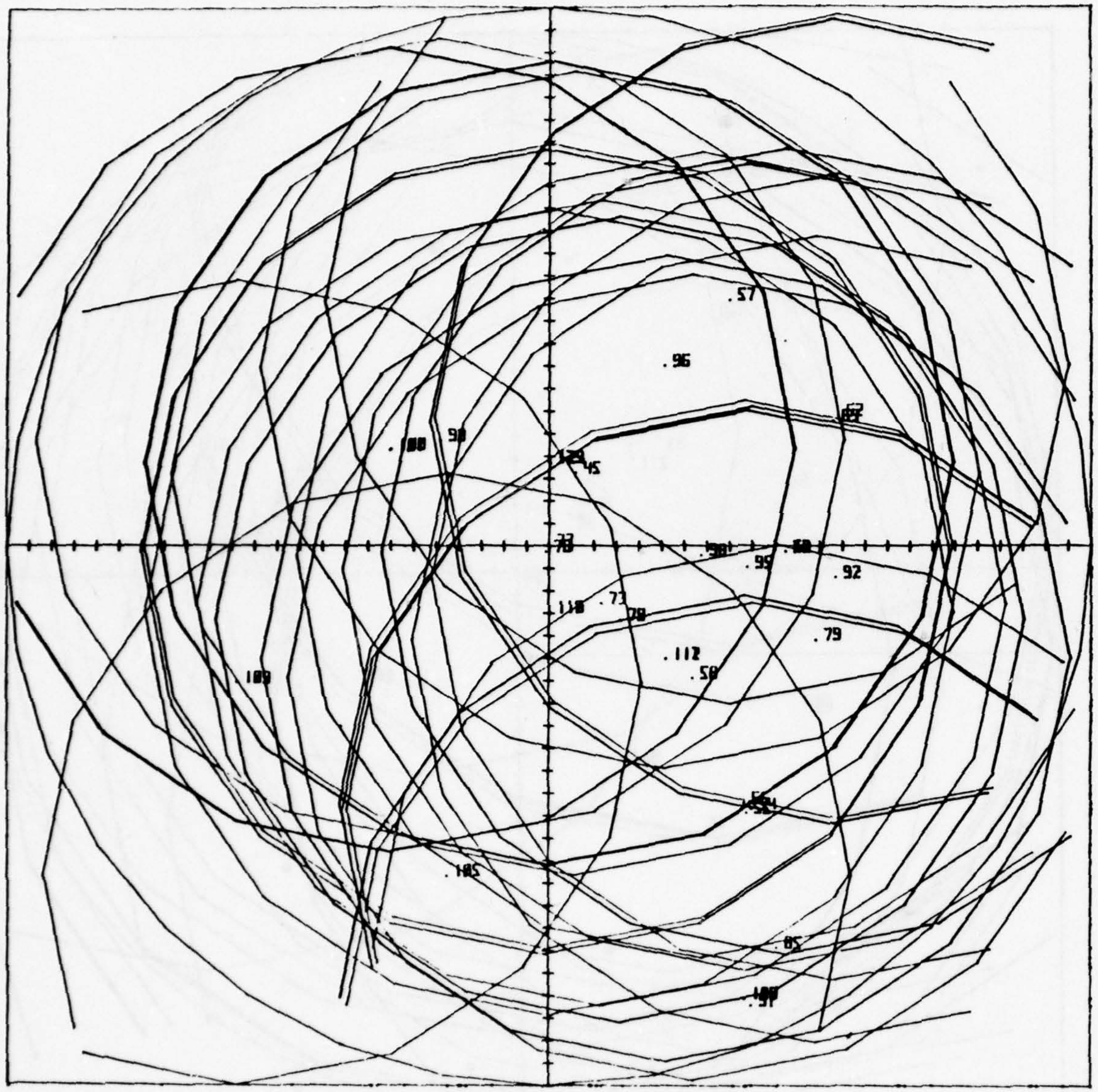
120 NM = 30 [illegible]

LAX



LOS ANGELES, CALIF.

HEIGHT 4000 GIVES RADIUS 89.44271910
SIZE OF AREA (RADIUS (NM)) 120

FILE # 77 USED AS NOMINAL SITE

RADAR	# 45	WITHIN	17.25077250	NM
RADAR	# 54	WITHIN	73.74448043	NM
RADAR	# 55	WITHIN	73.7677375	NM
RADAR	# 56	WITHIN	71.73013865	NM
RADAR	# 57	WITHIN	67.52680596	NM
RADAR	# 58	WITHIN	43.33289774	NM
RADAR	# 59	WITHIN	52.43304730	NM
RADAR	# 60	WITHIN	52.43304730	NM
RADAR	# 62	WITHIN	70.30014078	NM
RADAR	# 63	WITHIN	68.89122877	NM
RADAR	# 64	WITHIN	68.89122877	NM
RADAR	# 73	WITHIN	17.35084625	NM
RADAR	# 74	WITHIN	22.8158516	NM
RADAR	# 75	WITHIN	22.8158516	NM
RADAR	# 76	WITHIN	1.456358751	NM
RADAR	# 77	WITHIN	0 NM	
RADAR	# 79	WITHIN	62.74939986	NM
RADAR	# 85	WITHIN	102.7046966	NM
RADAR	# 90	WITHIN	33.69580253	NM
RADAR	# 91	WITHIN	111.5725267	NM
RADAR	# 92	WITHIN	63.90003630	NM
RADAR	# 95	WITHIN	44.22470619	NM
RADAR	# 96	WITHIN	47.44985092	NM
RADAR	# 98	WITHIN	33.81232818	NM
RADAR	# 100	WITHIN	41.02819033	NM
RADAR	# 101	WITHIN	41.14103636	NM
RADAR	# 105	WITHIN	76.67079292	NM
RADAR	# 106	WITHIN	109.498412	NM
RADAR	# 107	WITHIN	109.498412	NM
RADAR	# 108	WITHIN	109.498412	NM
RADAR	# 109	WITHIN	75.27420769	NM
RADAR	# 110	WITHIN	14.80475882	NM
RADAR	# 111	WITHIN	36.16432179	NM
RADAR	# 112	WITHIN	36.16432179	NM
RADAR	# 123	WITHIN	18.60401627	NM
RADAR	# 124	WITHIN	10.44623031	NM
RADAR	# 125	WITHIN	10.66375908	NM

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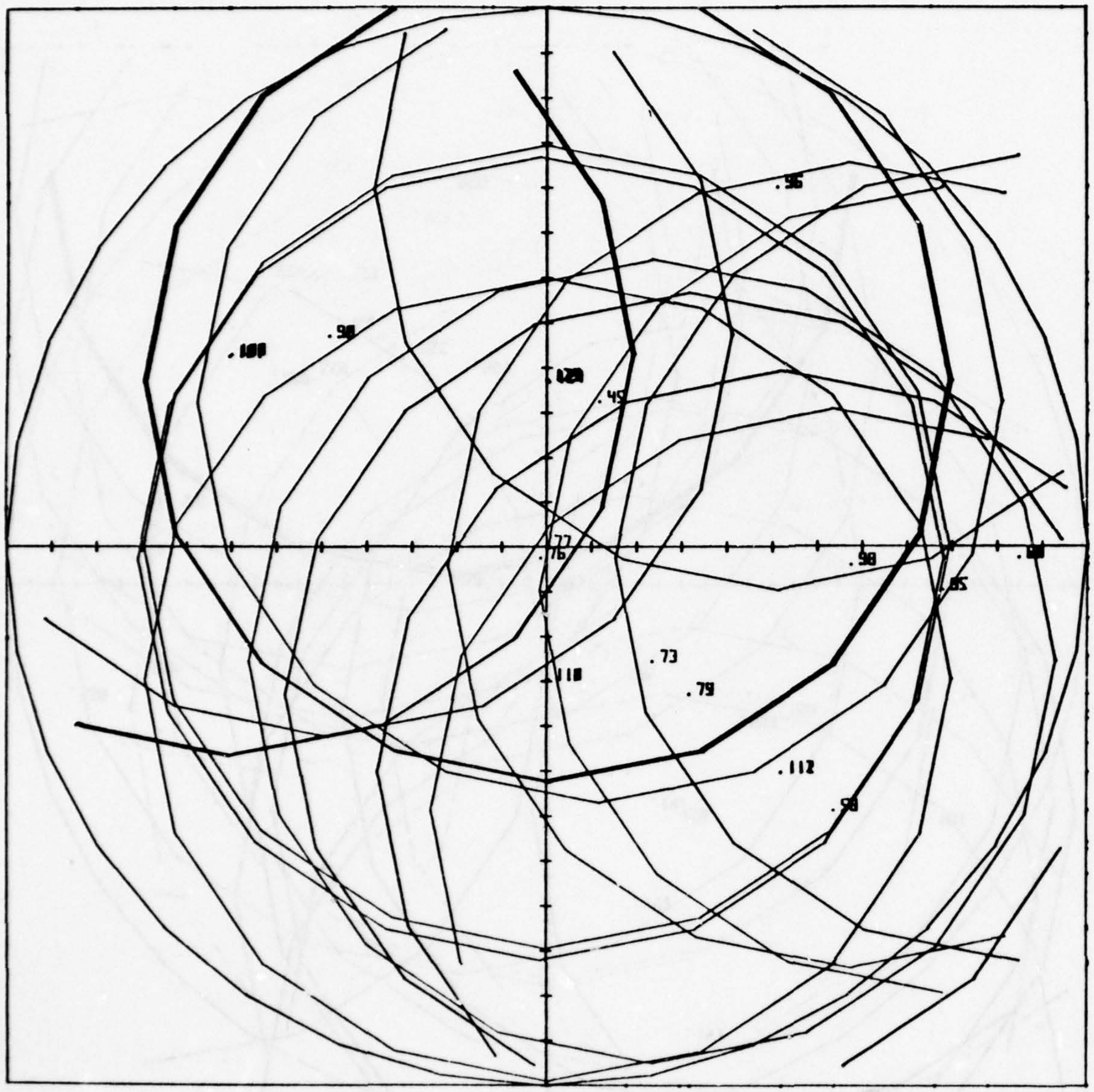
LAX

LOS ANGELES, CALIF.

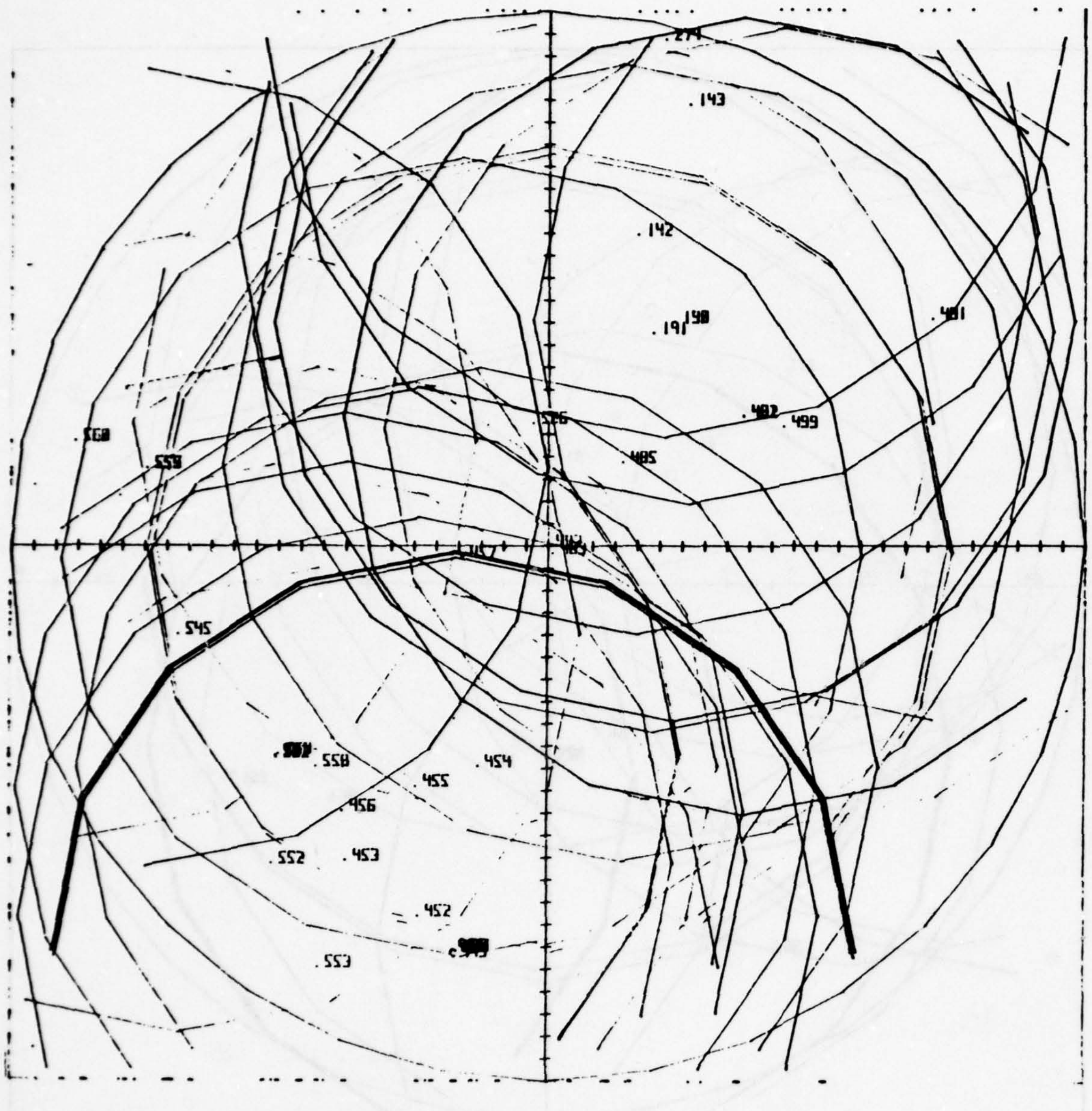


TGHT 1000 GIVES RADIUS 44.721359
CL OF AREA RADIUS (NM) > 60

TE # 77 USED AS NOMINAL SITE

RADAR	# 45	WITHIN	17.25077250	I
RADAR	# 58	WITHIN	43.33289774	I
RADAR	# 59	WITHIN	52.43304730	I
RADAR	# 60	WITHIN	52.43304730	I
RADAR	# 73	WITHIN	17.75084625	I
RADAR	# 74	WITHIN	22.8158516	
RADAR	# 75	WITHIN	22.8158516	
RADAR	# 76	WITHIN	1.45[illegible]	
RADAR	# 77	WITHIN	0 NM	
RADAR	# 90	WITHIN	35.69580753	
RADAR	# 95	WITHIN	44.23470619	
RADAR	# 96	WITHIN	47.44985647	
RADAR	# 98	WITHIN	33.81323818	
RADAR	# 100	WITHIN	41.03319033	
RADAR	# 101	WITHIN	41.14103636	
RADAR	# 110	WITHIN	14.50075882	
RADAR	# 111	WITHIN	36.16432179	
RADAR	# 112	WITHIN	36.16432179	
RADAR	# 123	WITHIN	18.60401627	
RADAR	# 124	WITHIN	18.44623431	
RADAR	# 125	WITHIN	18.66375808	

***** ***** ***** ***** *****



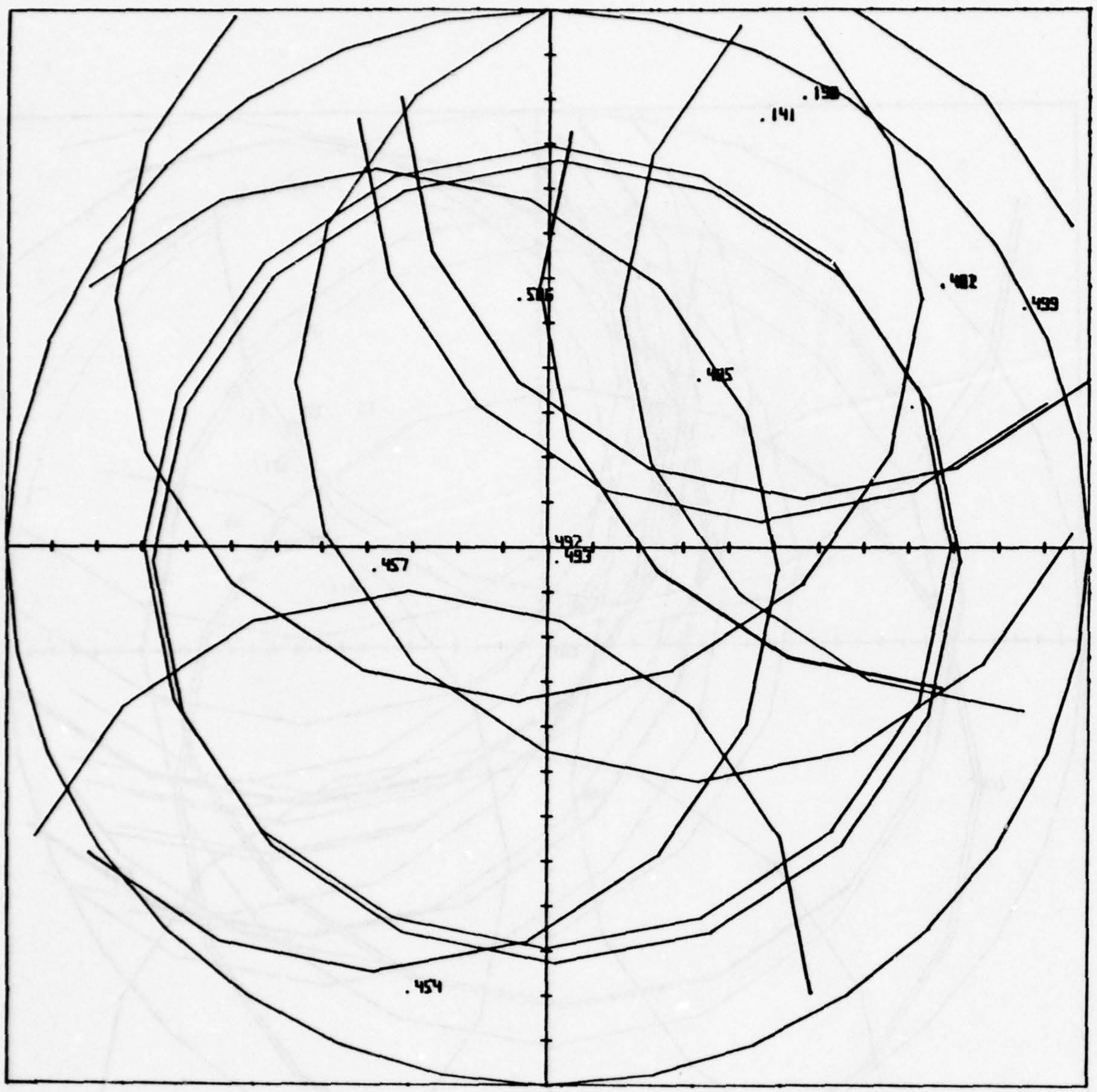
LGA

NEW YORK

HEIGHT 4000 GIVES RADIUS 89.44271910
SIZE OF AREA RADIUS (NM) 120

SITE # 492 USED AS NOMINAL SITE

RADAR #	139	WITHIN	57.56110066	NM
RADAR #	140	WITHIN	57.56110066	NM
RADAR #	141	WITHIN	53.15924510	NM
RADAR #	142	WITHIN	72.44171203	NM
RADAR #	143	WITHIN	103.3071919	NM
RADAR #	274	WITHIN	116.6958817	NM
RADAR #	446	WITHIN	93.12967021	NM
RADAR #	447	WITHIN	93.53136276	NM
RADAR #	448	WITHIN	92.92520454	NM
RADAR #	449	WITHIN	94.41745634	NM
RADAR #	450	WITHIN	93.12967021	NM
RADAR #	451	WITHIN	93.13759976	NM
RADAR #	452	WITHIN	87.9663397	NM
RADAR #	453	WITHIN	83.6052205	NM
RADAR #	454	WITHIN	51.96370544	NM
RADAR #	455	WITHIN	61.45007838	NM
RADAR #	456	WITHIN	74.9591175	NM
RADAR #	457	WITHIN	19.30931656	NM
RADAR #	481	WITHIN	52.5573939	NM
RADAR #	482	WITHIN	57.43979564	NM
RADAR #	485	WITHIN	25.04649003	NM
RADAR #	491	WITHIN	39.89296667	NM
RADAR #	492	WITHIN	0 NM	
RADAR #	493	WITHIN	1.911371826	NM
RADAR #	499	WITHIN	59.0653154	NM
RADAR #	506	WITHIN	37.76440383	NM
RADAR #	545	WITHIN	84.50529030	NM
RADAR #	552	WITHIN	94.01837479	NM
RADAR #	553	WITHIN	102.3157451	NM
RADAR #	555	WITHIN	91.18386265	NM
RADAR #	556	WITHIN	91.18386265	NM
RADAR #	557	WITHIN	91.18386265	NM
RADAR #	558	WITHIN	71.40072636	NM
RADAR #	560	WITHIN	103.1183265	NM
RADAR #	561	WITHIN	76.46253242	NM
RADAR #	562	WITHIN	76.03794664	NM
RADAR #	563	WITHIN	75.83460244	NM



LGA

NEW YORK

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HEIGHT 1000    GIVES RADIUS 44.72135955
SIZE OF AREA  RADIUS (NM) 60

ILE # 492  USED AS NOMINAL SITE

 RADAR # 139  WITHIN 57.56110066
 RADAR # 140  WITHIN 57.56110066
 RADAR # 141  WITHIN 53.15924510
 RADAR # 454  WITHIN 51.96370544
 RADAR # 457  WITHIN 19.38981656
 RADAR # 481  WITHIN 52.5573939
 RADAR # 482  WITHIN 52.49979564
 RADAR # 485  WITHIN 25.04849008
 RADAR # 492  WITHIN 0    NM
 RADAR # 493  WITHIN 1.911371826
 RADAR # 499  WITHIN 59.0083154
 RADAR # 506  WITHIN 27.76998203
 ***  *****  *****  *****  *****
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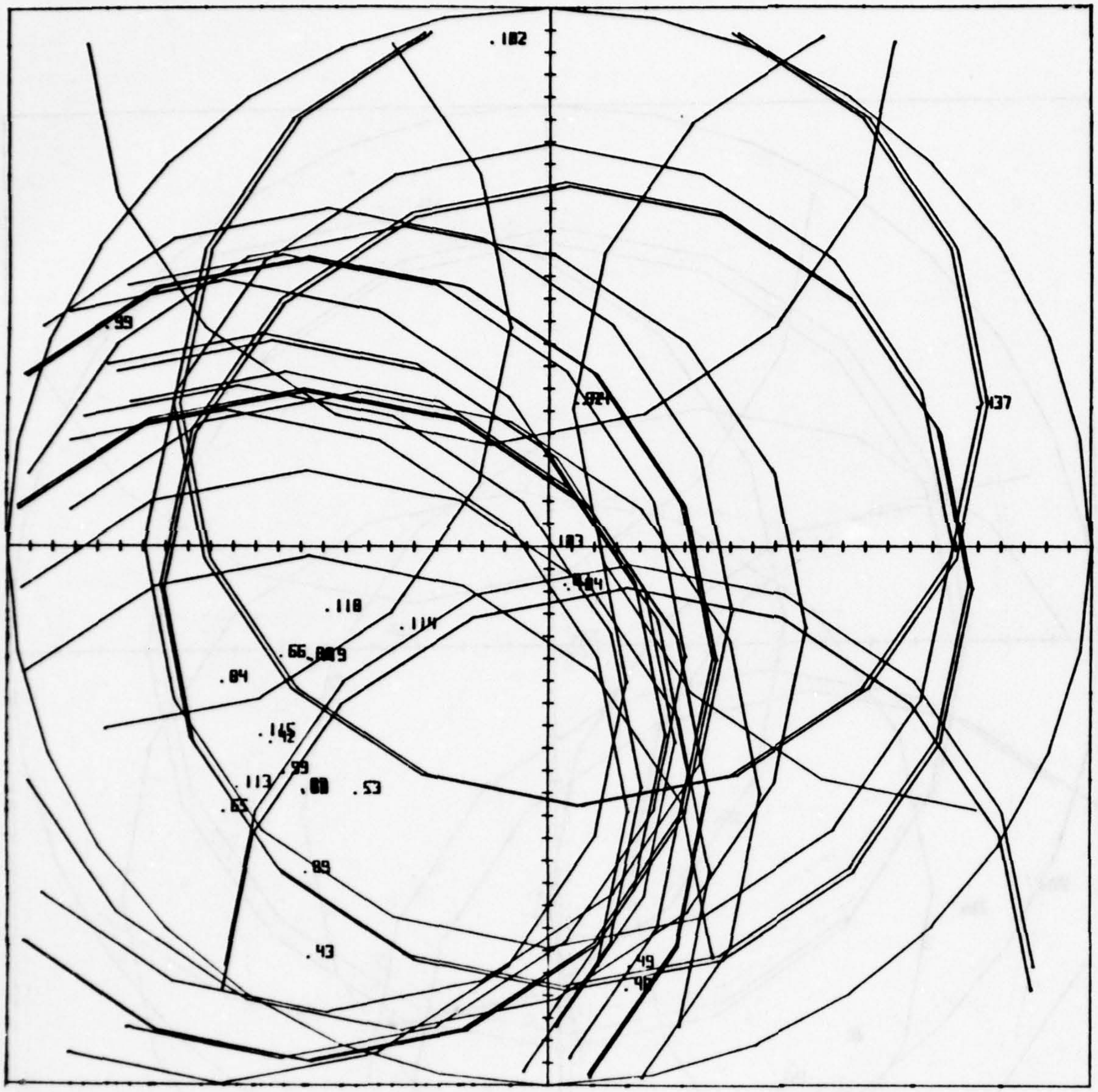
MCC

SACREMENTO, CALIF.

McCLELLAN/BEALE



HEIGHT 4000 GIVES RADIUS 89.4427191

SIZE OF AREA (RADIUS (NM)) 120

FILE # 103 USED AS NOMINAL SITE

RADAR	# 42	WITHIN	75.29761136	NM
RADAR	# 43	WITHIN	105.7502725	NM
RADAR	# 44	WITHIN	32.59914897	NM
RADAR	# 47	WITHIN	100.0718594	NM
RADAR	# 48	WITHIN	100.1237675	NM
RADAR	# 49	WITHIN	95.10020693	NM
RADAR	# 53	WITHIN	69.54628895	NM
RADAR	# 65	WITHIN	92.92209964	NM
RADAR	# 66	WITHIN	64.02337060	NM
RADAR	# 67	WITHIN	76.69811118	NM
RADAR	# 68	WITHIN	77.01349366	NM
RADAR	# 69	WITHIN	77.01349366	NM
RADAR	# 80	WITHIN	58.65021865	NM
RADAR	# 81	WITHIN	58.65021865	NM
RADAR	# 82	WITHIN	32.27615467	NM
RADAR	# 83	WITHIN	9.222392949	NM
RADAR	# 84	WITHIN	78.17496072	NM
RADAR	# 89	WITHIN	90.28365658	NM
RADAR	# 93	WITHIN	77.27827822	NM
RADAR	# 94	WITHIN	77.27827822	NM
RADAR	# 99	WITHIN	109.3670099	NM
RADAR	# 102	WITHIN	112.7074013	NM
RADAR	# 103	WITHIN	0	NM
RADAR	# 104	WITHIN	10.4183025	NM
RADAR	# 113	WITHIN	67.19931690	NM
RADAR	# 114	WITHIN	37.27076297	NM
RADAR	# 115	WITHIN	76.18418579	NM
RADAR	# 118	WITHIN	50.98423539	NM
RADAR	# 119	WITHIN	58.03877599	NM
RADAR	# 437	WITHIN	99.73565773	NM

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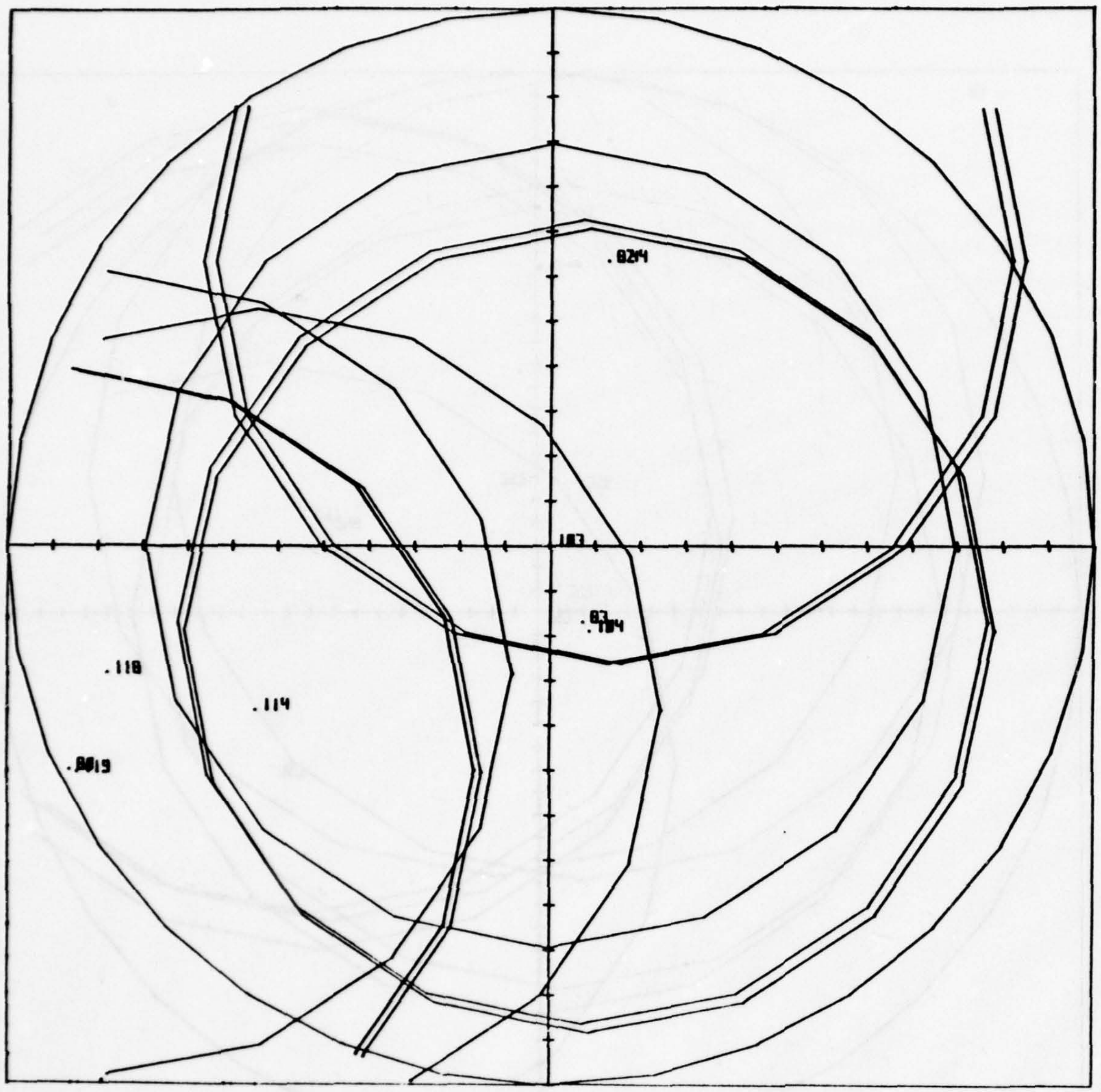


MCC

SACRAMENTO, CALIF.
McCLELLAN/BEALE

HEIGHT 1000   GIVES RADIUS 44.72135
SIZE OF AREA RADIUS (NM)> 60

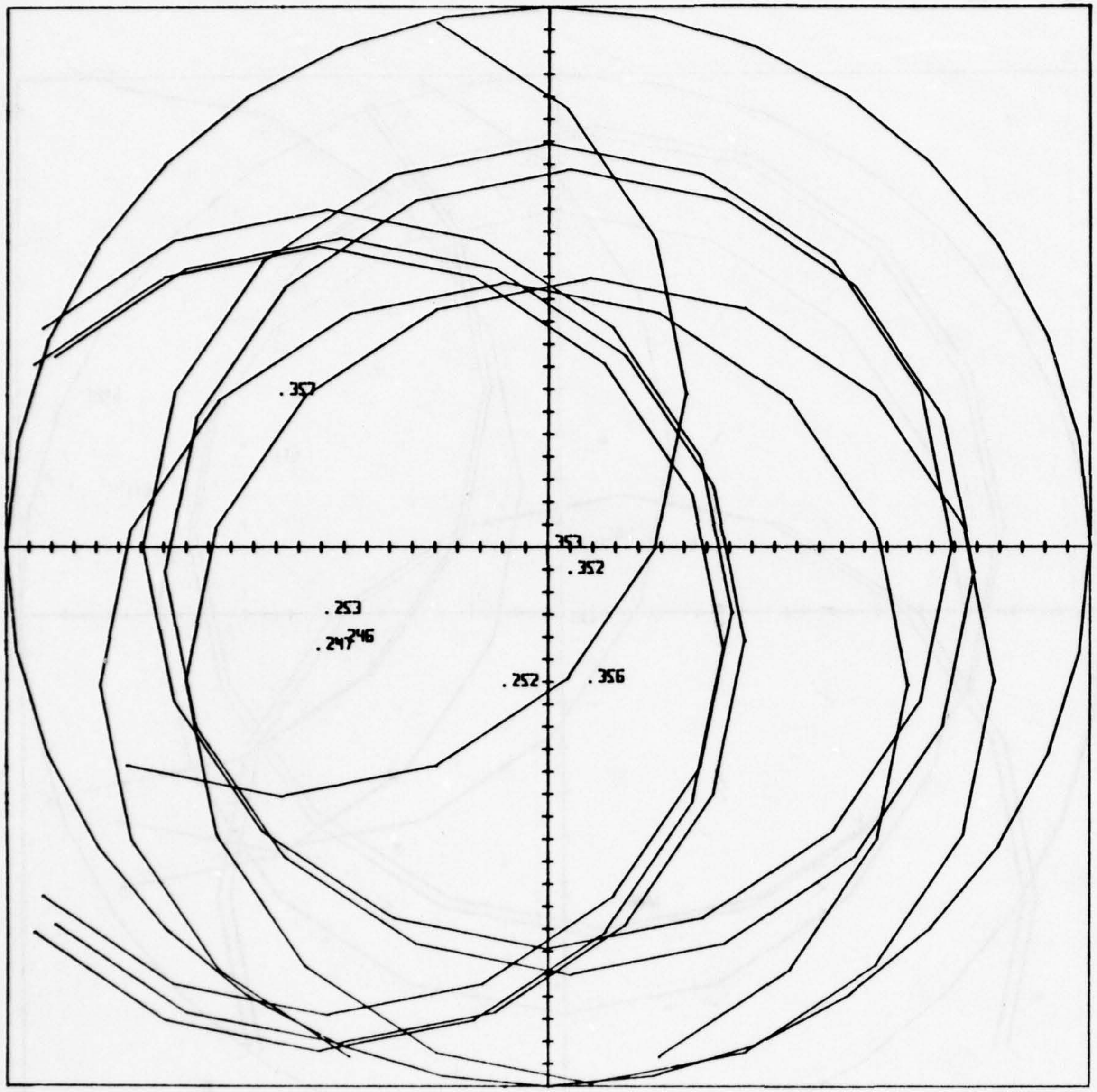
SITE # 103 USED AS NOMINAL SITE

RADAR #	44	WITHIN	32.59914897
RADAR #	80	WITHIN	58.65021865
RADAR #	81	WITHIN	58.65021865
RADAR #	82	WITHIN	37.27615467
RADAR #	83	WITHIN	9.222392949
RADAR #	103	WITHIN	0 NM
RADAR #	104	WITHIN	10.4183025
RADAR #	114	WITHIN	37.27076297
RADAR #	118	WITHIN	50.98423539
RADAR #	119	WITHIN	58.03877599

*** ***** ***** ***** *****

M C I

KANSAS CITY INTL.

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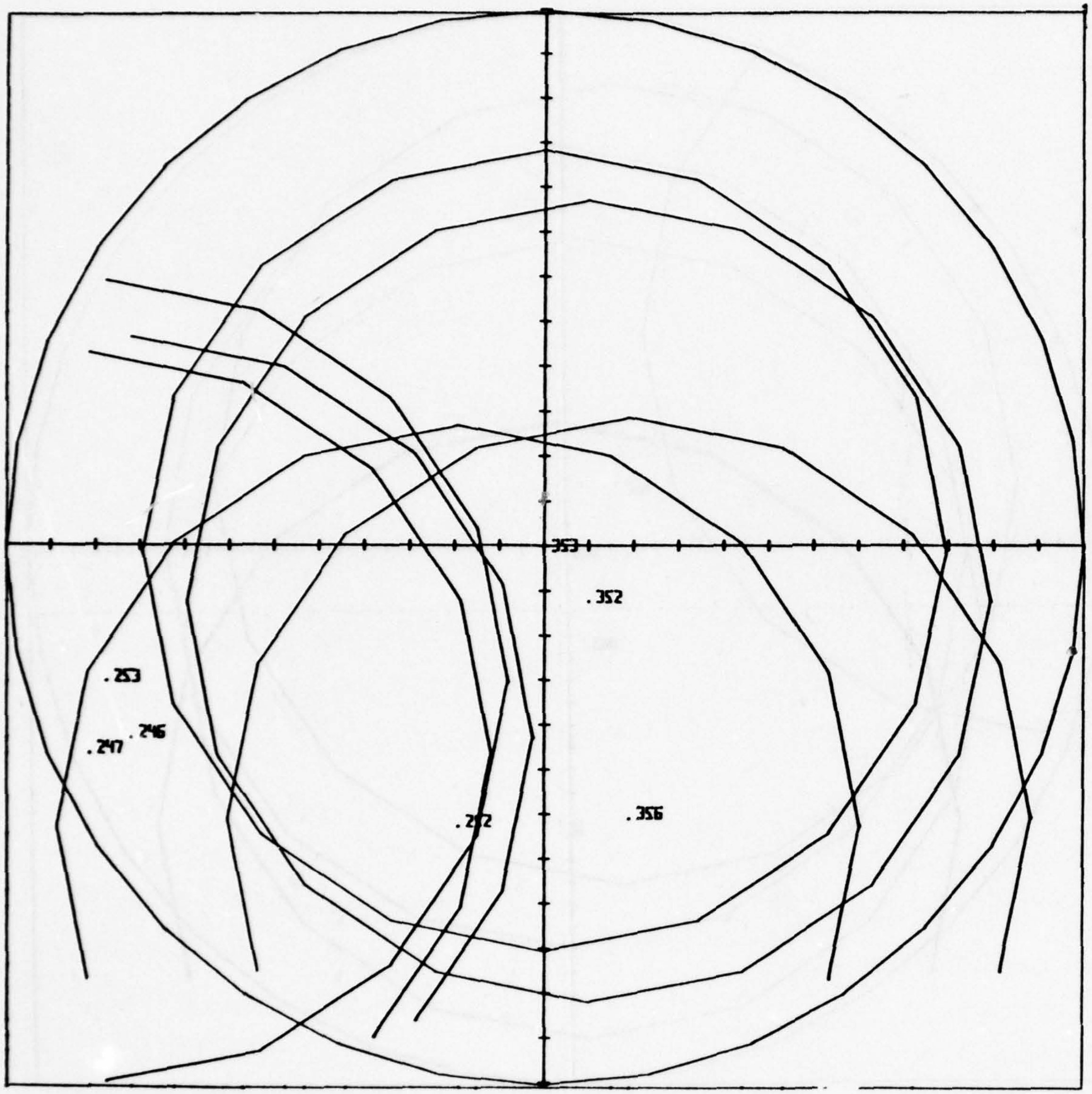
[illegible] 4000     GIVES RADIUS [illegible].44[illegible]71[illegible]
[illegible]E OF AREA  RADIUS (NM)  120

LE # 353  USED AS NOMINAL SITE

RADAR # 246  WITHIN 50.54763005   N
RADAR # 247  WITHIN 55.[illegible]0053320   N
RADAR # 252  WITHIN 32.28[illegible]738   N
RADAR # 253  WITHIN 50.95379325   I
RADAR # 352  WITHIN 7.504787147   I
RADAR # 353  WITHIN 0     NM
RADAR # 356  WITHIN 31.[illegible]641545   I
RADAR # 357  WITHIN 67.[illegible]18[illegible]   I
***   *****  *****    ****  *****
```

MCI

KANSAS CITY INTL.

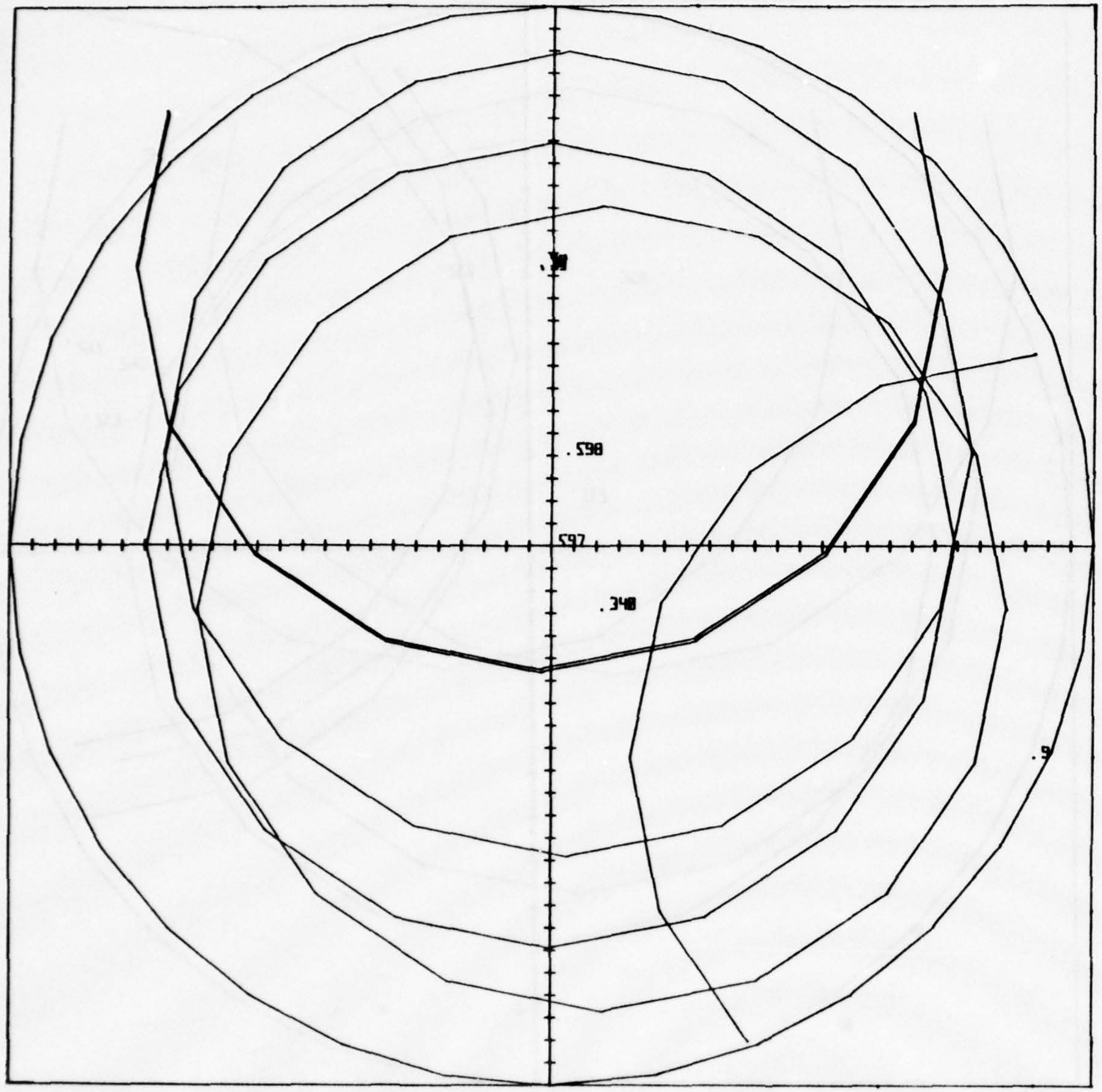


FLIGHT 1000 GIVES RADIUS 44.72135
SIZE OF AREA RADIUS (NM) 60

FILE # 353 USED AS NOMINAL SITE

RADAR	#	246	WITHIN	50.54763005	I
RADAR	#	247	WITHIN	55.53053420	I
RADAR	#	252	WITHIN	32.28372730	I
RADAR	#	253	WITHIN	50.95379925	N
RADAR	#	352	WITHIN	7.504787147	N
RADAR	#	353	WITHIN	0 NM	
RADAR	#	356	WITHIN	31.33641545	N

**** ***** ***** ***** *****



MEM

MEMPHIS, TENN.

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.UNT 4000    GIVES RADIUS 89.442719
.L OF AREA  RADIUS (NM)  120

.E # 597  USED AS NOMINAL SITE

RADAR # 9     WITHIN 116.85682196   N
RADAR # 35    WITHIN 61.37313972    N
RADAR # 36    WITHIN 62.10011450    N
RADAR # 340   WITHIN 10.08168345    N
RADAR # 597   WITHIN 0     NM
RADAR # 598   WITHIN 20.68652492    N
... *****  *****  *****  *****
```
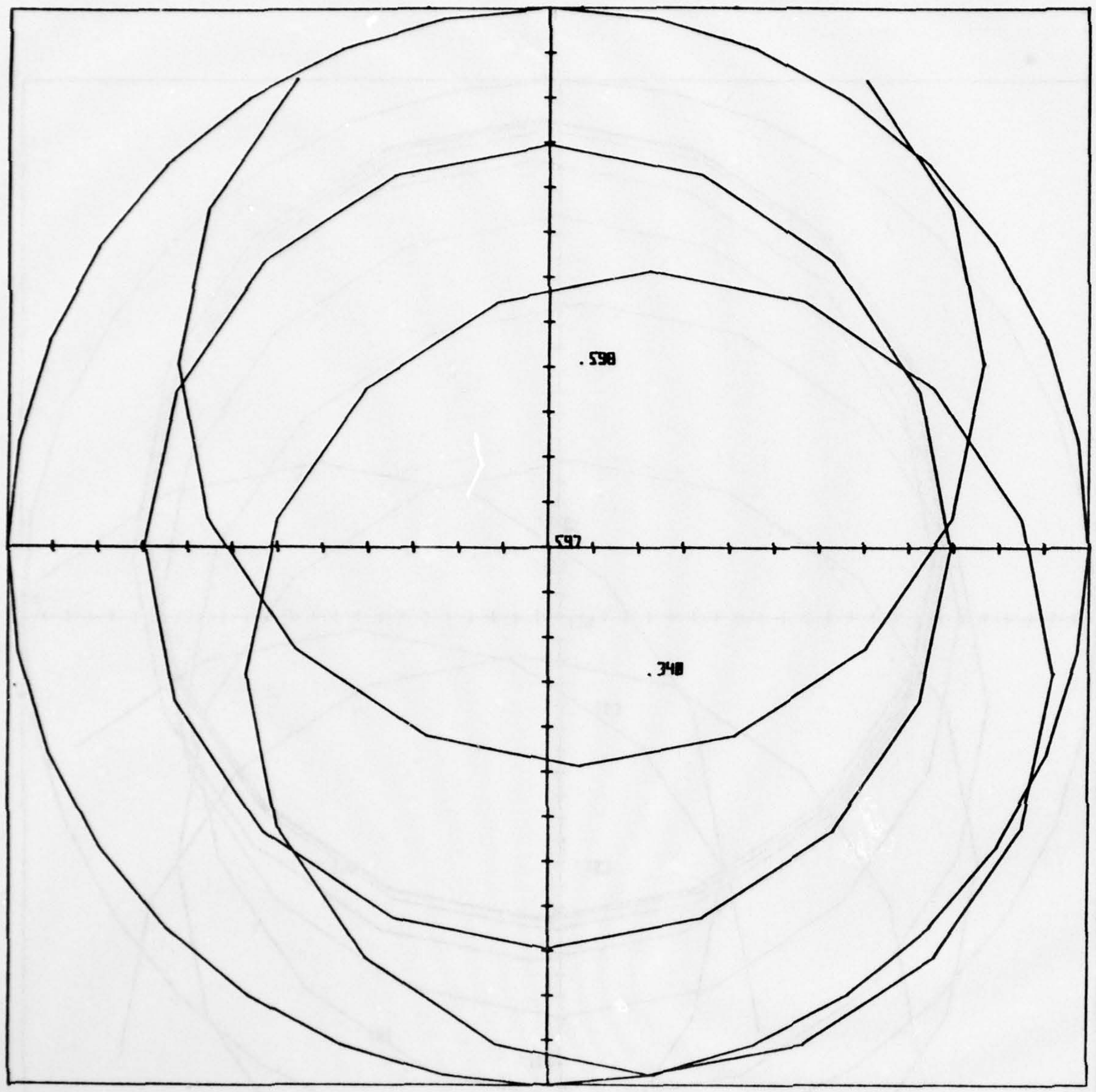



MEM

MEMPHIS, TENN.

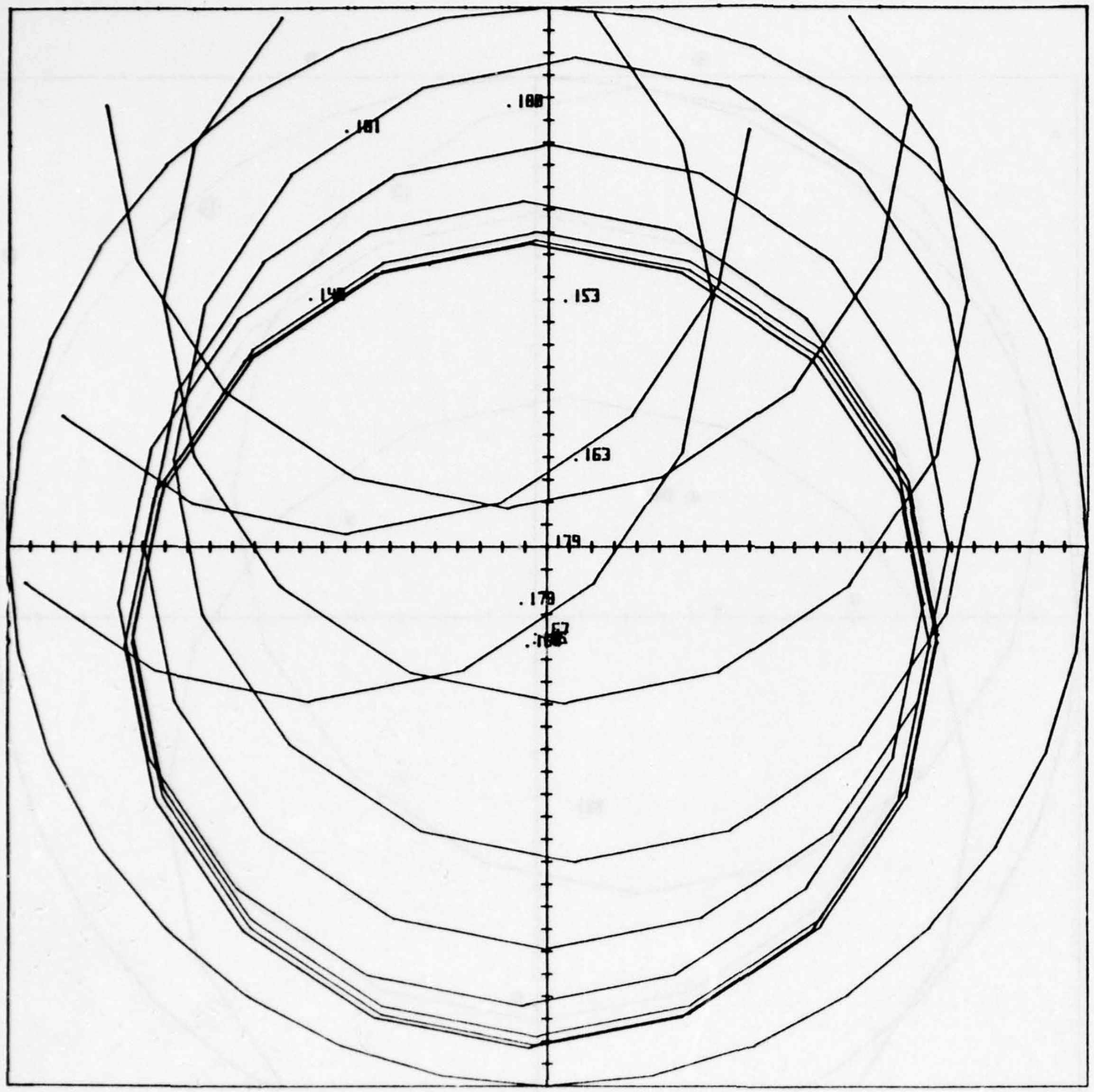
IGHT 1000 GIVES RADIUS 44.72135
CE OF AREA RADIUS (NM) 60

TE # 597 USED AS NOMINAL SITE

RADAR # 340 WITHIN 18.00108345
RADAR # 597 WITHIN 0 NM
RADAR # 598 WITHIN 20.68652452
*** ***** ***** ***** *****

MIA

MIAMI, FLORIDA



IGHT 4000 GIVES RADIUS 89.4427
ZE OF AREA (RADIUS (NM)) 120

LE # 179 USED AS NOMINAL SITE

RADAR	# 148	WITHIN	76.2712102	|
RADAR	# 153	WITHIN	54.78994035	|
RADAR	# 163	WITHIN	20.38766923	|
RADAR	# 164	WITHIN	22.4115262	|
RADAR	# 165	WITHIN	21.50308055	|
RADAR	# 166	WITHIN	22.4115262	|
RADAR	# 167	WITHIN	19.61537025	|
RADAR	# 178	WITHIN	13.84271983	|
RADAR	# 179	WITHIN	0 NM	
RADAR	# 180	WITHIN	98.44680016	|
RADAR	# 181	WITHIN	102.5536796	|

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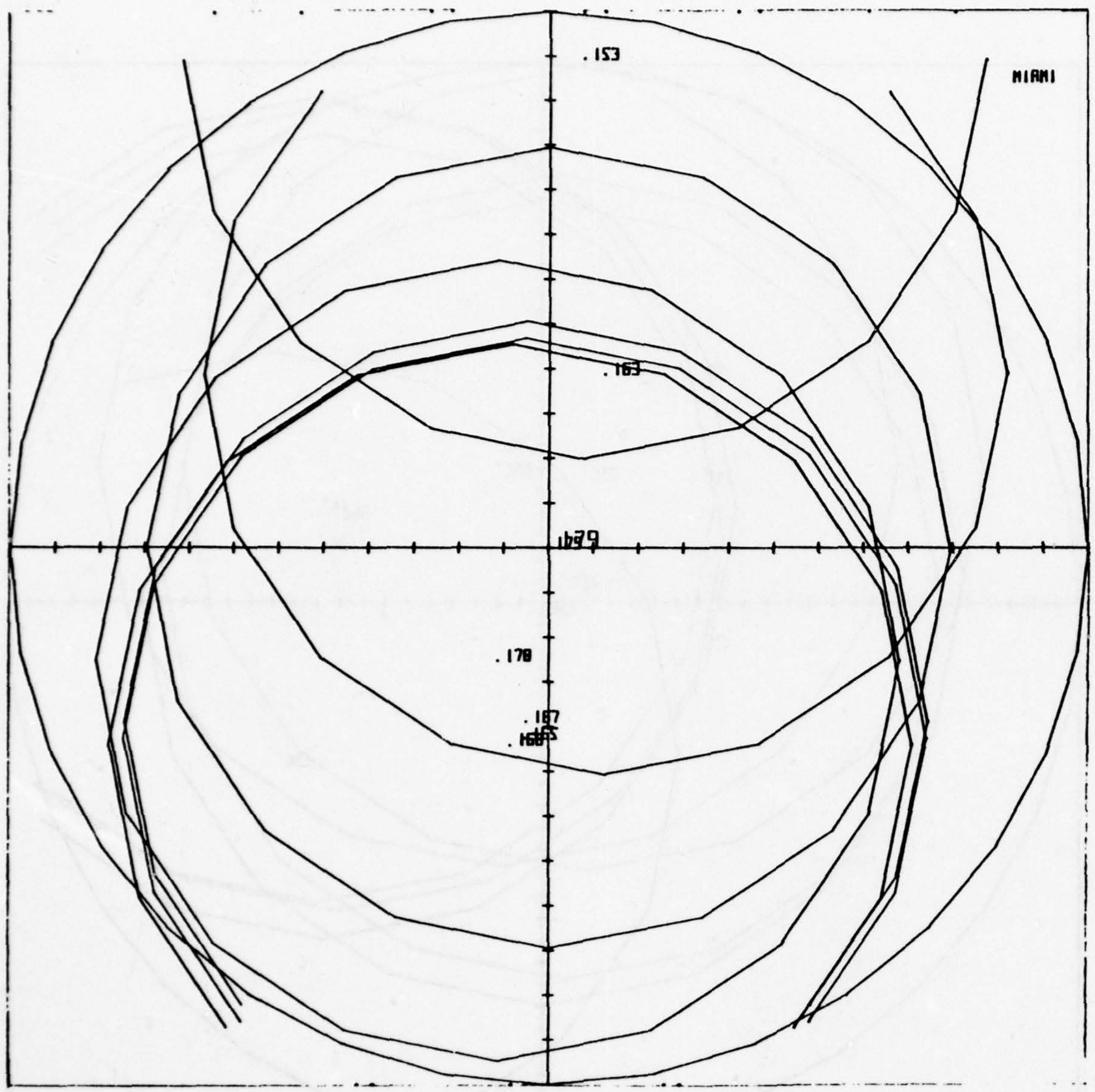
M I A

MIAMI, FLORIDA

HE .72135955
SIZE OF AREA RADIUS (NM)> 60

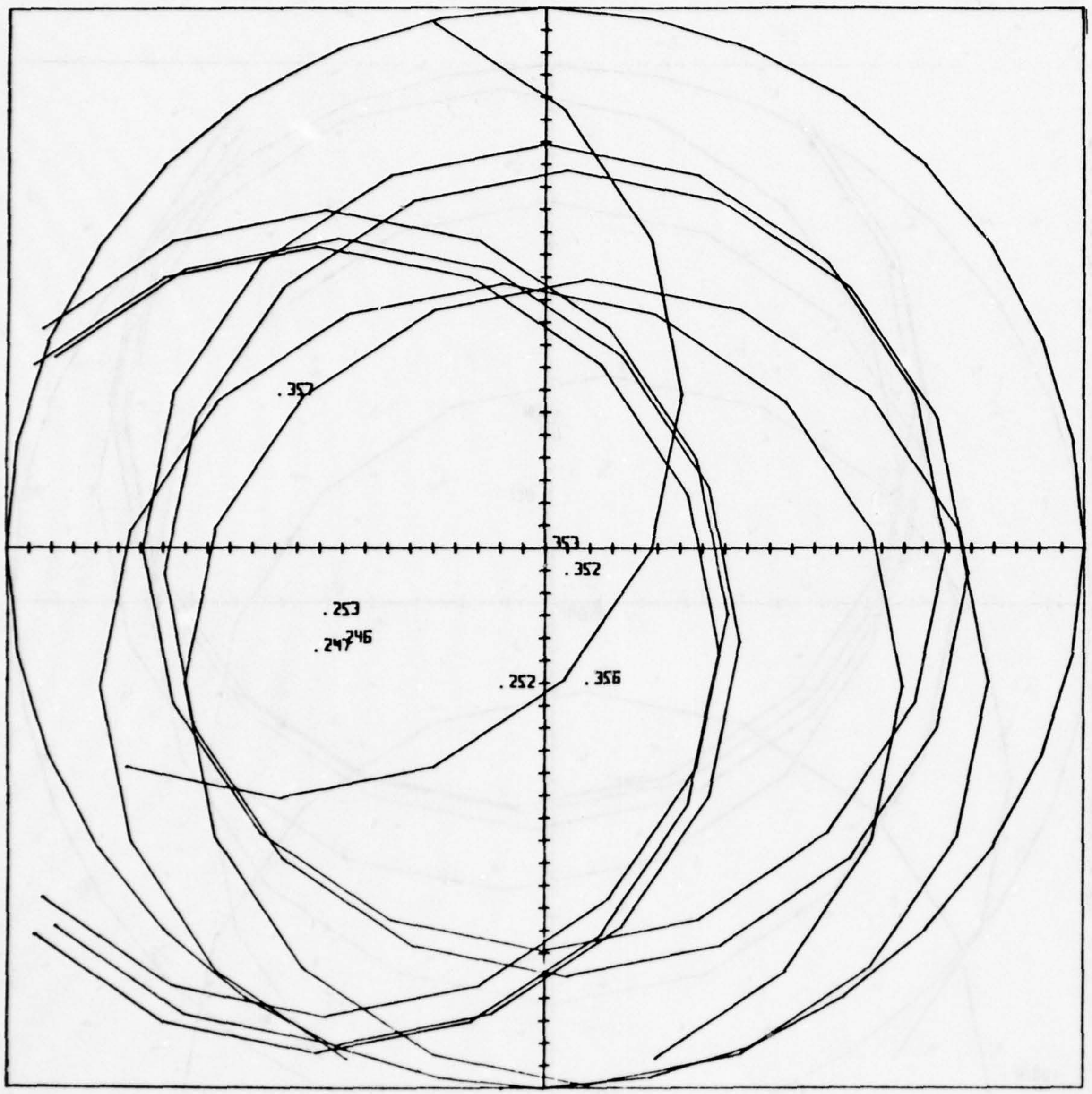
FILE # 179 USED AS NOMINAL SITE

RADAR # 153	WITHIN	54.78994033	NM
RADAR # 163	WITHIN	20.36706923	NM
RADAR # 164	WITHIN	22.4115262	NM
RADAR # 165	WITHIN	21.50308065	NM
RADAR # 166	WITHIN	22.4115262	NM
RADAR # 167	WITHIN	19.61537825	NM
RADAR # 178	WITHIN	13.84271985	NM
RAD		NM	



M K C

KANSAS CITY, MO



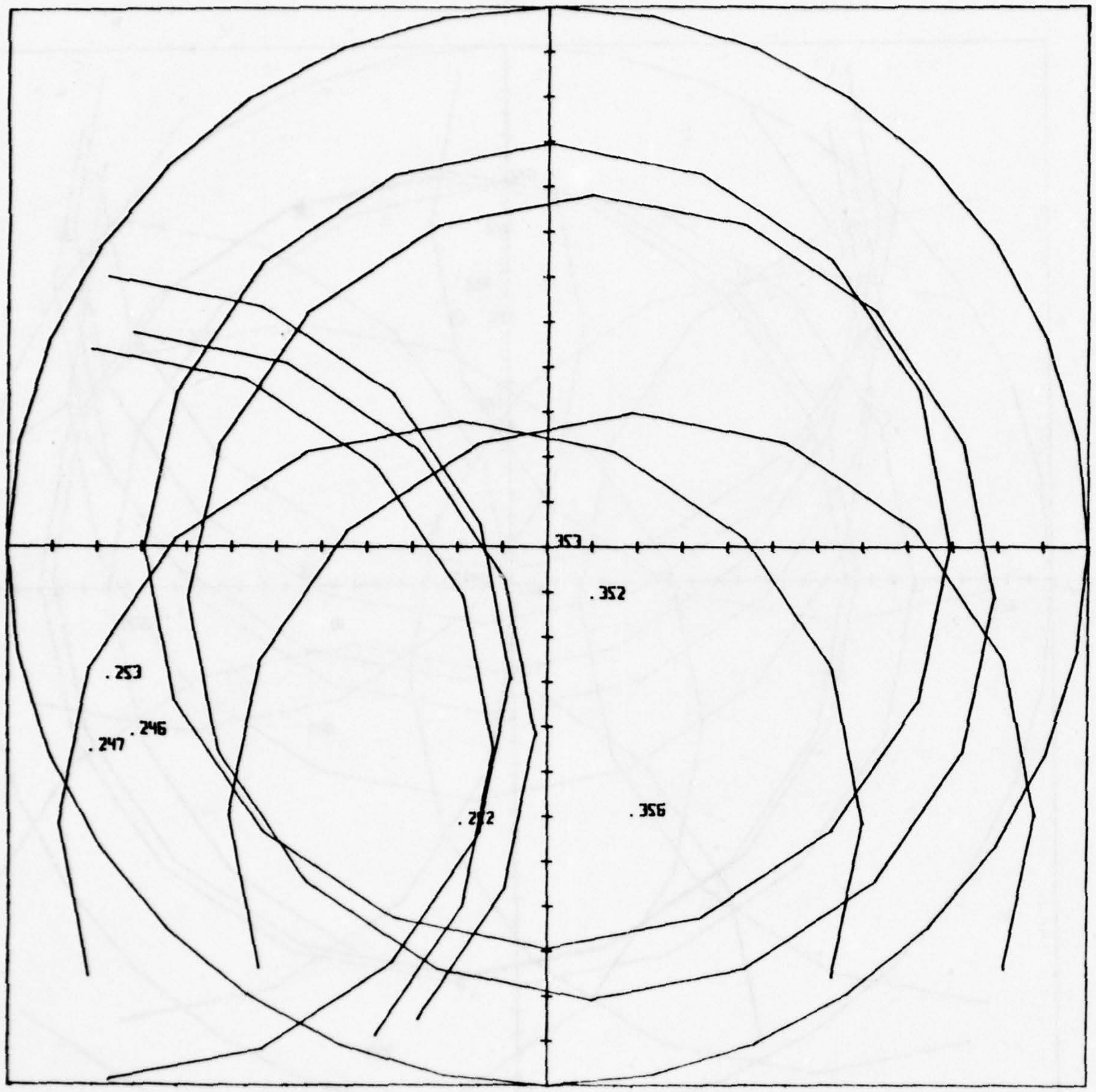
[illegible] 4000 GIVES RADIUS 8[illegible].44271
[illegible] OF AREA (RADIUS (NM)) 1[illegible]0

SITE # 353 USED AS NOMINAL SITE

RADAR #	246	WITHIN	50.54763005
RADAR #	247	WITHIN	55.5305[illegible]
RADAR #	252	WITHIN	[illegible]
RADAR #	253	WITHIN	50.[illegible]
RADAR #	352	WITHIN	7.50478714
RADAR #	353	WITHIN	0 NM
RADAR #	356	WITHIN	31.[illegible]41545
RADAR #	357	WITHIN	67.[illegible]

M K C

KANSAS CITY, MO



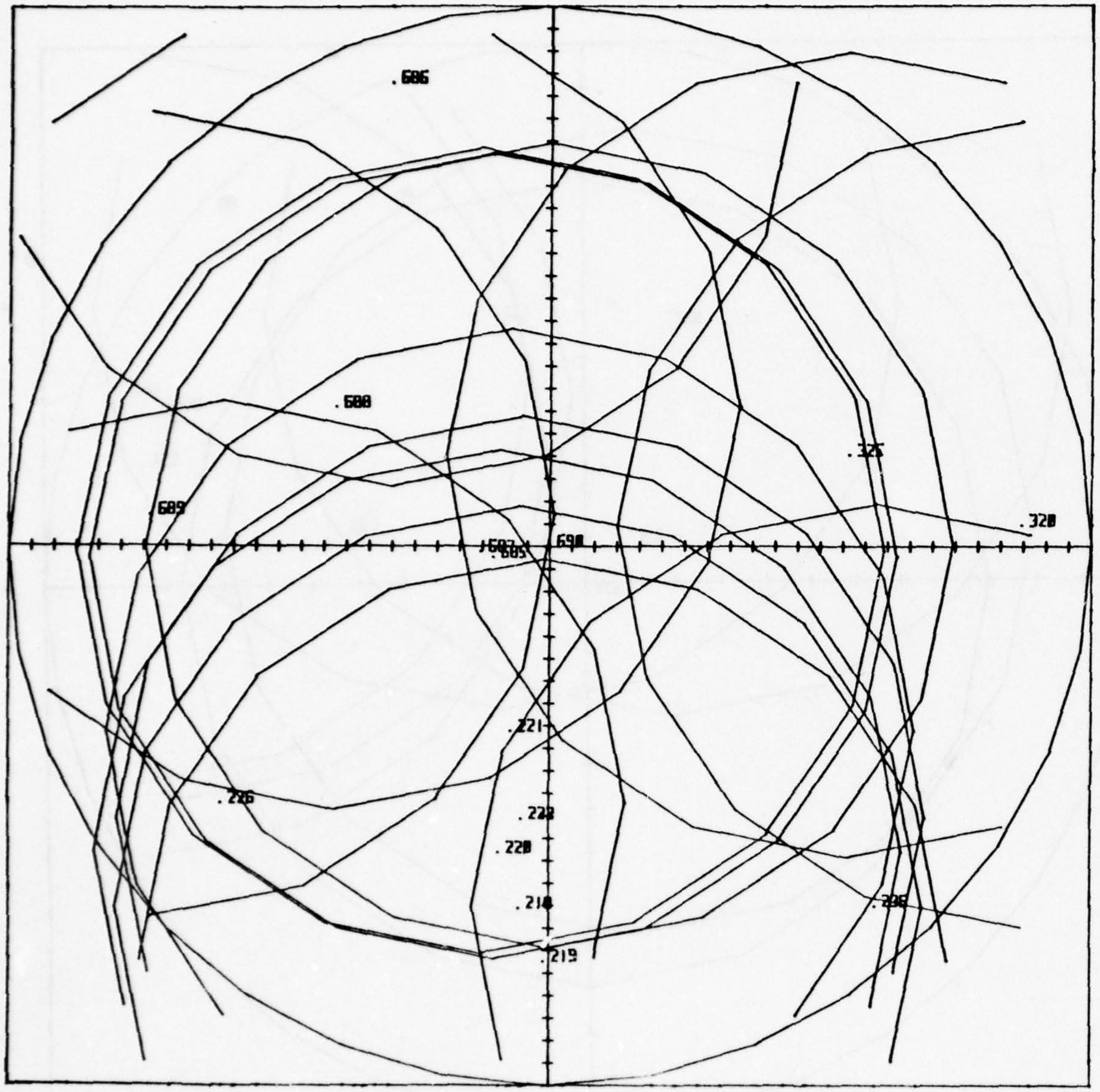
[illegible] GIVES RADIUS 44.721359
SIZE OF AREA (RADIUS (NM)) 60

FILE # 353 USED AS NOMINAL SITE

RADAR # 246 WITHIN 50.5476 3005 NM
RADAR # 247 WITHIN 55.5305330 NM
RADAR # 252 WITHIN 32.28372738 NM
RADAR # 253 WITHIN 50.45379925 NM
RADAR # 352 WITHIN 7.504787147 NM
RADAR # 353 WITHIN 0 NM
RADAR # 356 WITHIN 31.33641545
*** ***** ***** ***** *****

MKE

MILWAUKEE, WIS.



HEIGHT 4000 GIVEN RADIUS 69.442[illegible]
SIZE OF AREA RADIUS (NM) 120

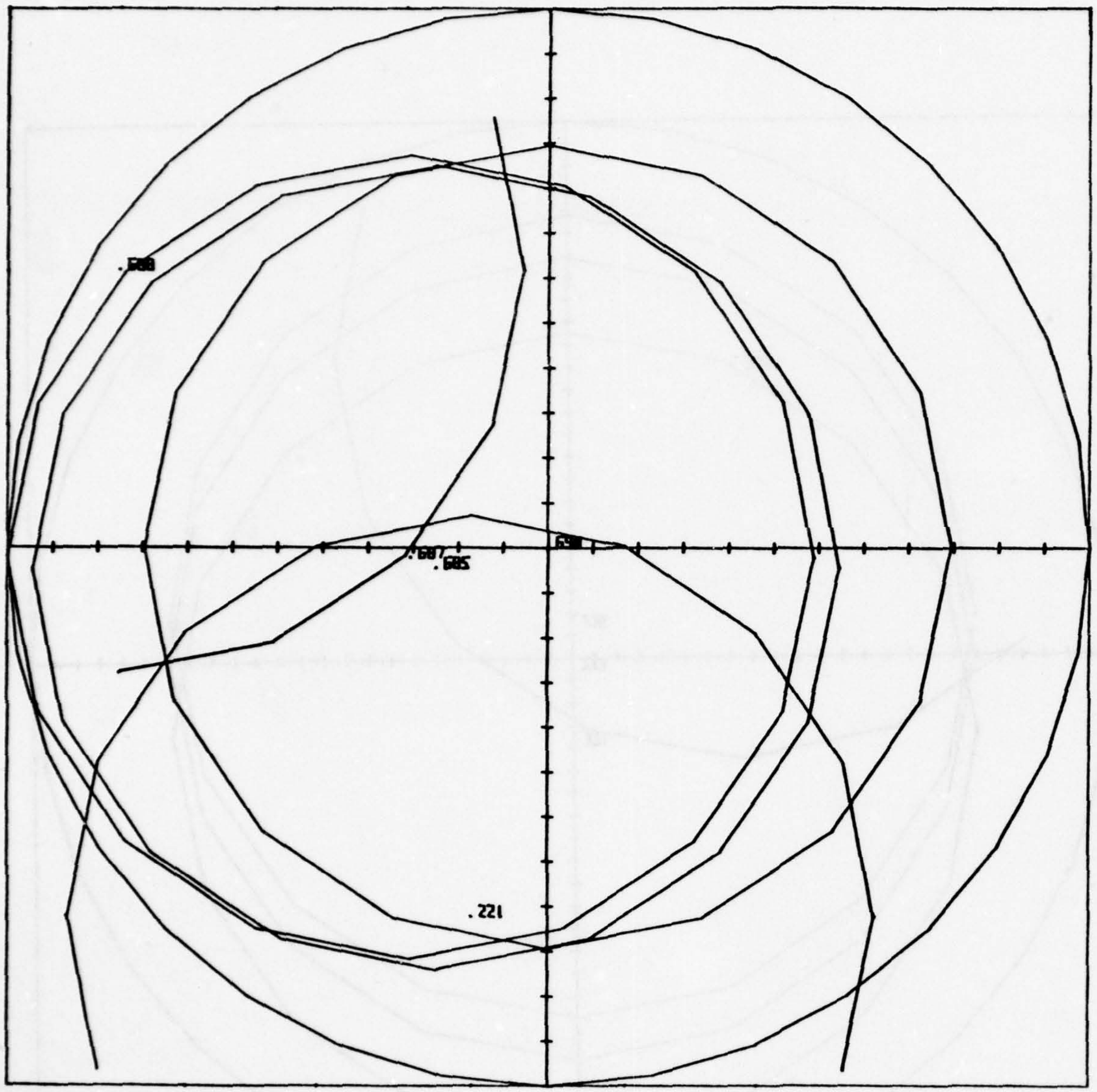
SITE # 690 USED AS NOMINAL SITE

RADAR # 218	WITHIN	80.74822392		N
RADAR # 219	WITHIN	92.2474[illegible]		N
RADAR # 220	WITHIN	69.0[illegible]7464		N
RADAR # 221	WITHIN	42.03316024		N
RADAR # 222	WITHIN	60.9108[illegible]		[illegible]
RADAR # 226	WITHIN	92.369[illegible]		[illegible]
RADAR # 236	WITHIN	107.[illegible]		[illegible]
RADAR # 320	WITHIN	104.5890311		
RADAR # 325	WITHIN	69.20[illegible]244		[illegible]
RADAR # 685	WITHIN	12.6530[illegible]		[illegible]
RADAR # 686	WITHIN	108.5[illegible]1574		[illegible]
RADAR # 687	WITHIN	15.31844[illegible]		[illegible]
RADAR # 688	WITHIN	56.5[illegible]4059		[illegible]
RADAR # 689	WITHIN	88.[illegible]		[illegible]
RADAR # 690	WITHIN	0	NM	

....

MKE

MILWAUKEE, WIS.



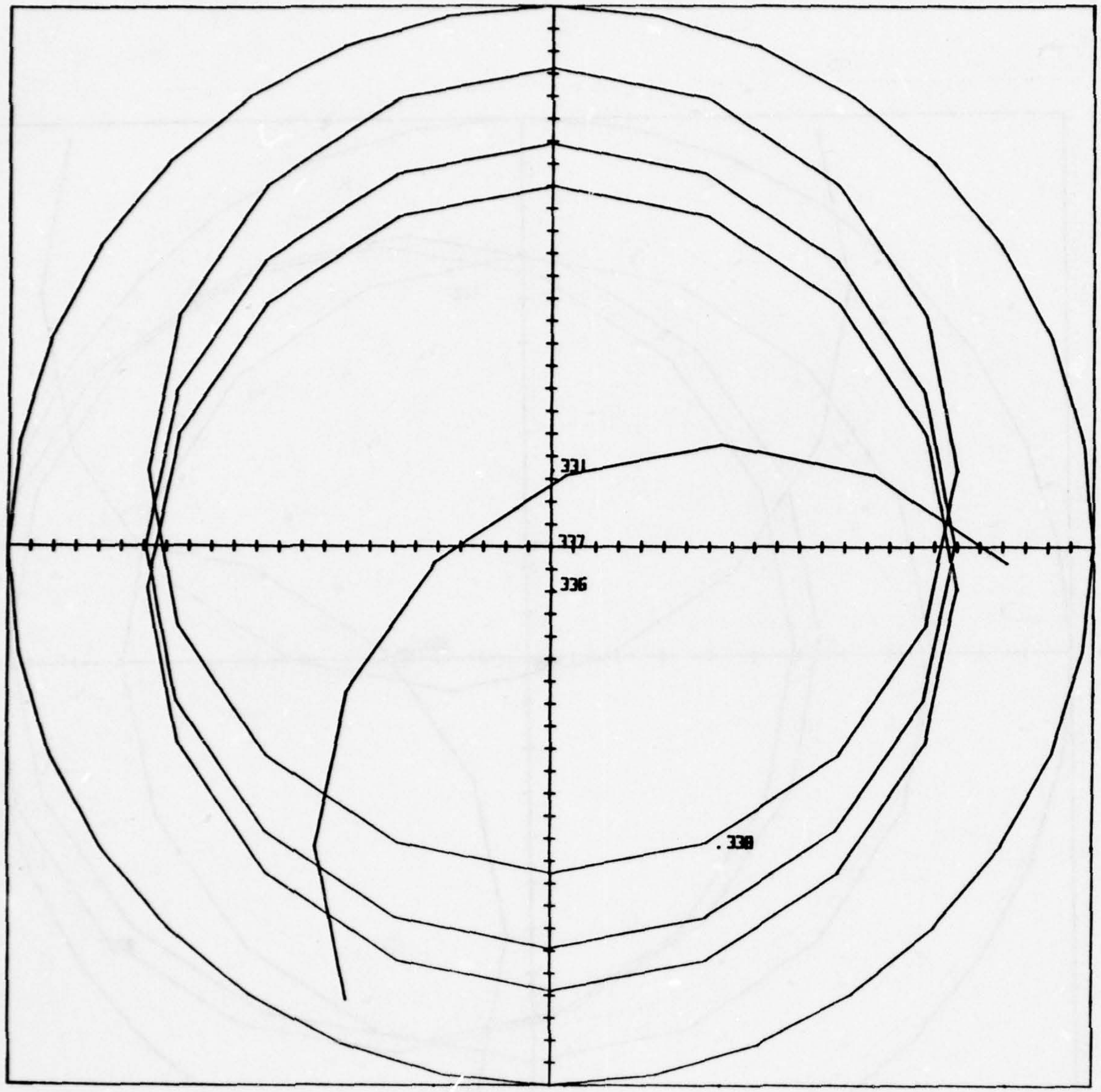
IGHT 1000   GIVES RADIUS 44.721359
CE OF AREA RADIUS (NM) 60

LE # 690 USED AS NOMINAL SITE

RADAR # 221 WITHIN 42.07316024
RADAR # 685 WITHIN 12.65309338
RADAR # 687 WITHIN 15.31844333
RADAR # 688 WITHIN 56.57574859
RADAR # 690 WITHIN 0 NM
*** ***** ***** ***** *****

MSP

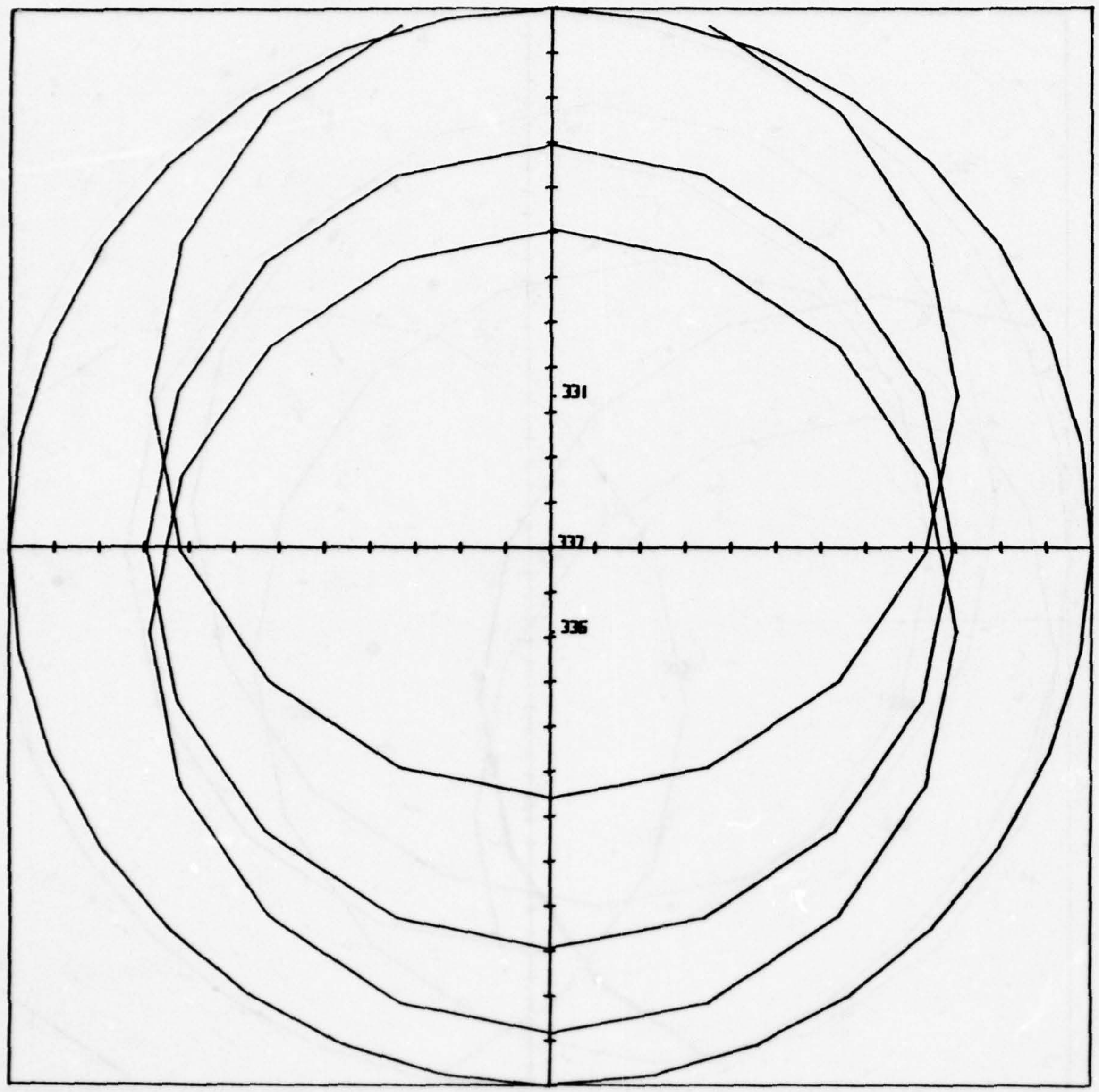
MINNEAPOLIS ST. PAUL, MINN.



IGHT 4000 GIVES RADIUS 89.442719
ZE OF AREA (RADIUS (NM) 120

E # 337 USED AS NOMINAL SITE

RADAR # 331 WITHIN 16.7441052 !
RADAR # 336 WITHIN 9.470165095 !
RADAR # 337 WITHIN 0 NM
RADAR # 338 WITHIN 76.64808944 !
RADAR # 339 WITHIN 76.64808944 !
*** ***** ***** ***** *****



MSP

MINNEAPOLIS ST. PAUL, MINN.

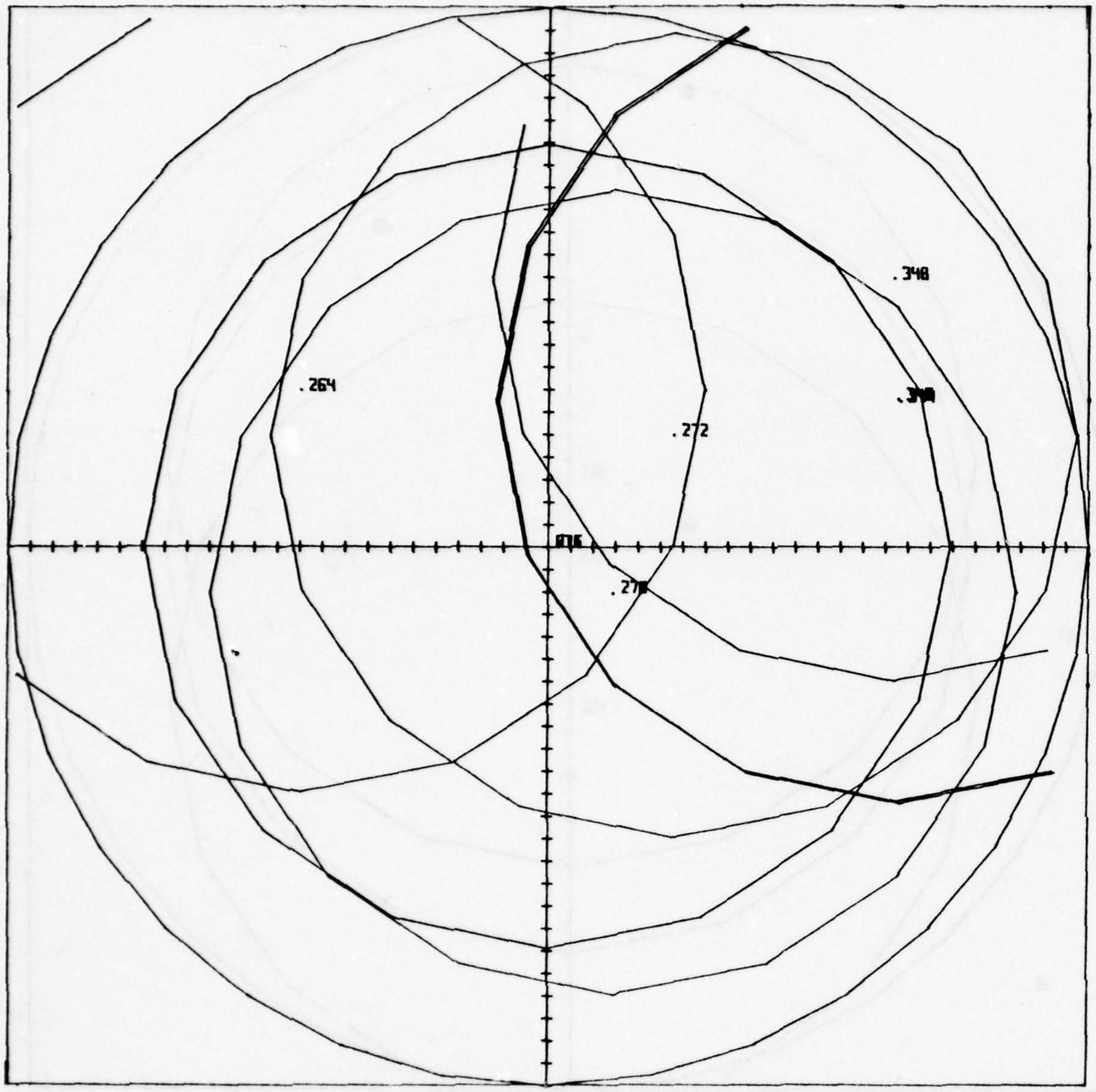
IGHT 1000   GIVES RADIUS 44.7213
ZE OF AREA RADIUS (NM) 60

TE # 337 USED AS NOMINAL SITE

RADAR # 331 WITHIN 16.7441052
RADAR # 336 WITHIN 9.470165895
RADAR # 337 WITHIN 0 NM
*** ***** ***** ***** *****

M S Y

NEW ORLEANS (MOISANT)



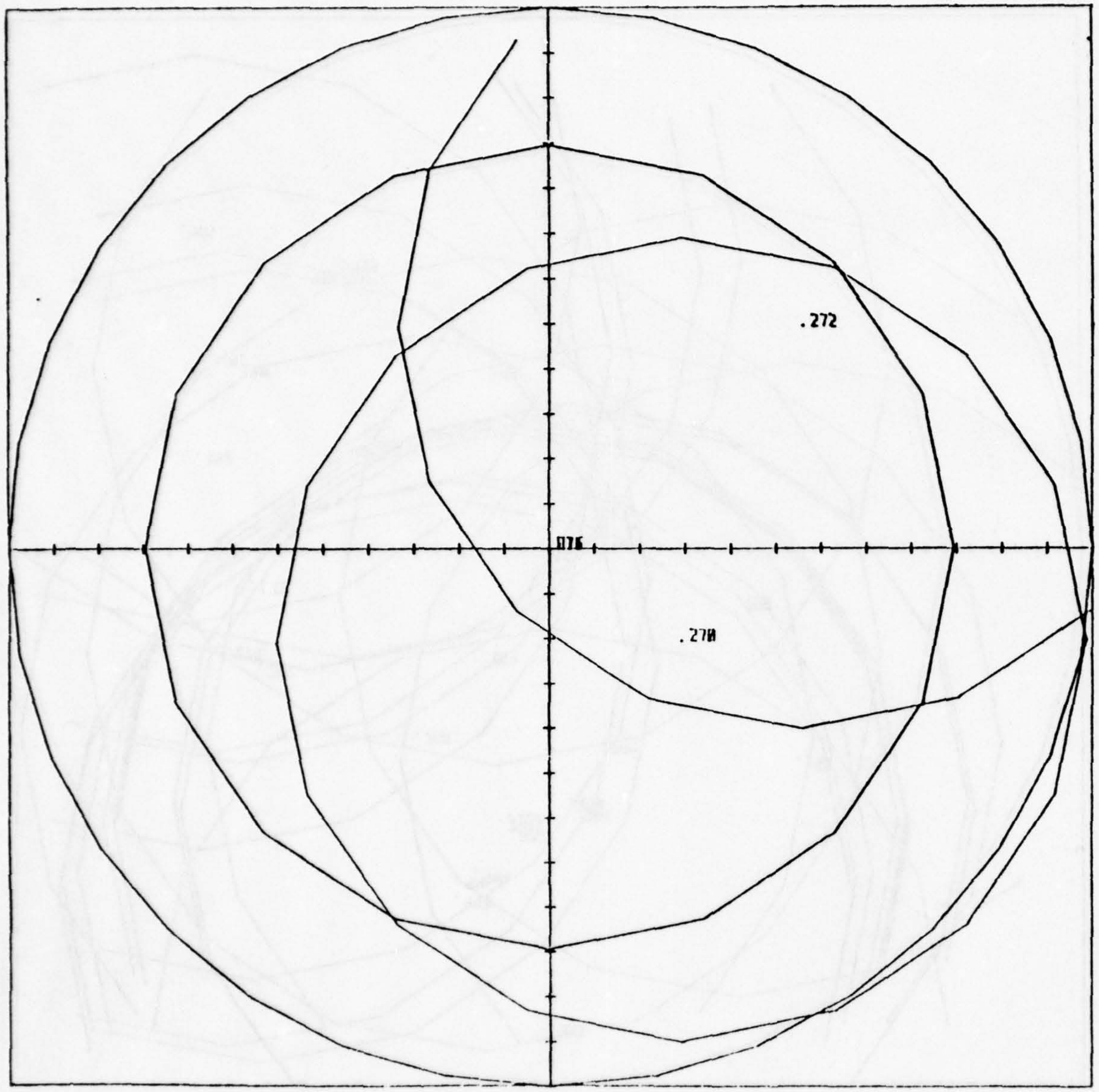
IGHT 4000 GIVES RADIUS 89.44271
ZE OF AREA RADIUS (NM) 120

SITE # 271 USED AS NOMINAL SITE

RADAR # 264 WITHIN 64.7496815[illegible]
RADAR # 270 WITHIN 17.8408285
RADAR # 271 WITHIN 0 NM
RADAR # 272 WITHIN 37.349[illegible]143
RADAR # 344 WITHIN 84.7095963
RADAR # 345 WITHIN 84.375534[illegible]
RADAR # 346 WITHIN 84.3594243
RADAR # 347 WITHIN 84.3755348
RADAR # 348 WITHIN 47.2[illegible]515
RADAR # 616 WITHIN 0 NM
*** ***** ***** ***** *****

M S Y

NEW ORLEANS (MOISANT)



N C O

PROVIDENCE, R. I.

QUONSET PT.

HEIGHT 4000 GIVES RADIUS 89.44271910
SIZE OF AREA RADIUS (NM) 120

ILE # 565 USED AS NOMINAL SITE

RADAR	#	139	WITHIN	81.3420479	NM
RADAR	#	140	WITHIN	81.3420479	NM
RADAR	#	141	WITHIN	86.70292037	NM
RADAR	#	142	WITHIN	81.27269899	NM
RADAR	#	143	WITHIN	66.9754213	NM
RADAR	#	274	WITHIN	75.39459919	NM
RADAR	#	275	WITHIN	62.08700548	NM
RADAR	#	276	WITHIN	61.82400889	NM
RADAR	#	277	WITHIN	63.70687883	N
RADAR	#	278	WITHIN	56.67152092	N
RADAR	#	279	WITHIN	56.49175019	N
RADAR	#	280	WITHIN	44.10932596	N
RADAR	#	281	WITHIN	58.85078342	N
RADAR	#	282	WITHIN	60.27277945	N
RADAR	#	283	WITHIN	73.36881982	N
RADAR	#	284	WITHIN	45.13417363	N
RADAR	#	285	WITHIN	69.93518948	N
RADAR	#	286	WITHIN	50.76041693	N
RADAR	#	287	WITHIN	50.76041693	N
RADAR	#	442	WITHIN	80.93000967	N
RADAR	#	443	WITHIN	107.0690239	N
RADAR	#	444	WITHIN	74.32165310	N
RADAR	#	445	WITHIN	76.56925695	N
RADAR	#	481	WITHIN	83.01159622	N
RADAR	#	482	WITHIN	83.11036415	N
RADAR	#	485	WITHIN	109.503426	N
RADAR	#	491	WITHIN	43.38646207	N
RADAR	#	499	WITHIN	79.49248376	N
RADAR	#	564	WITHIN	27.40886523	N
RADAR	#	565	WITHIN	0	NM

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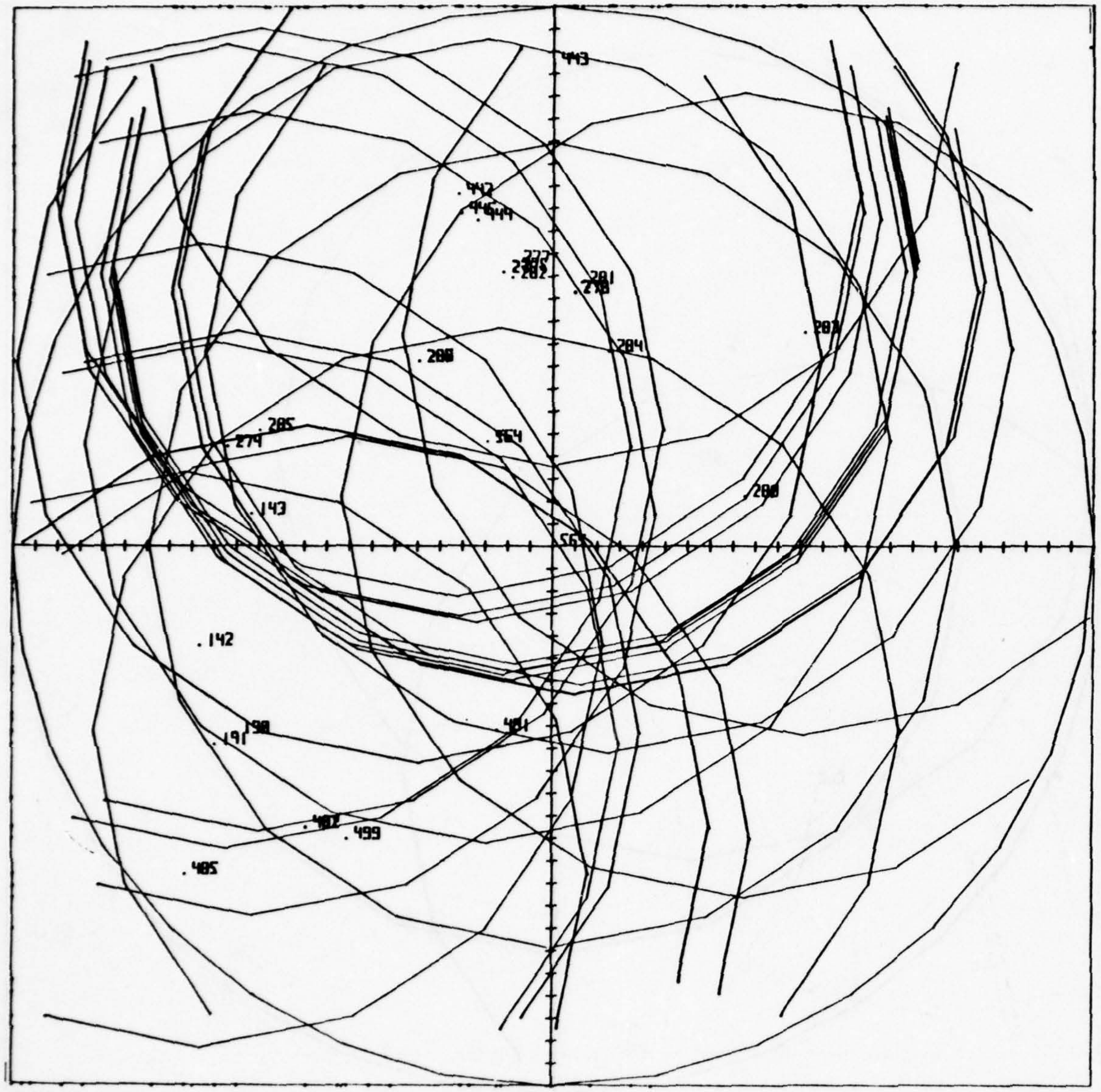
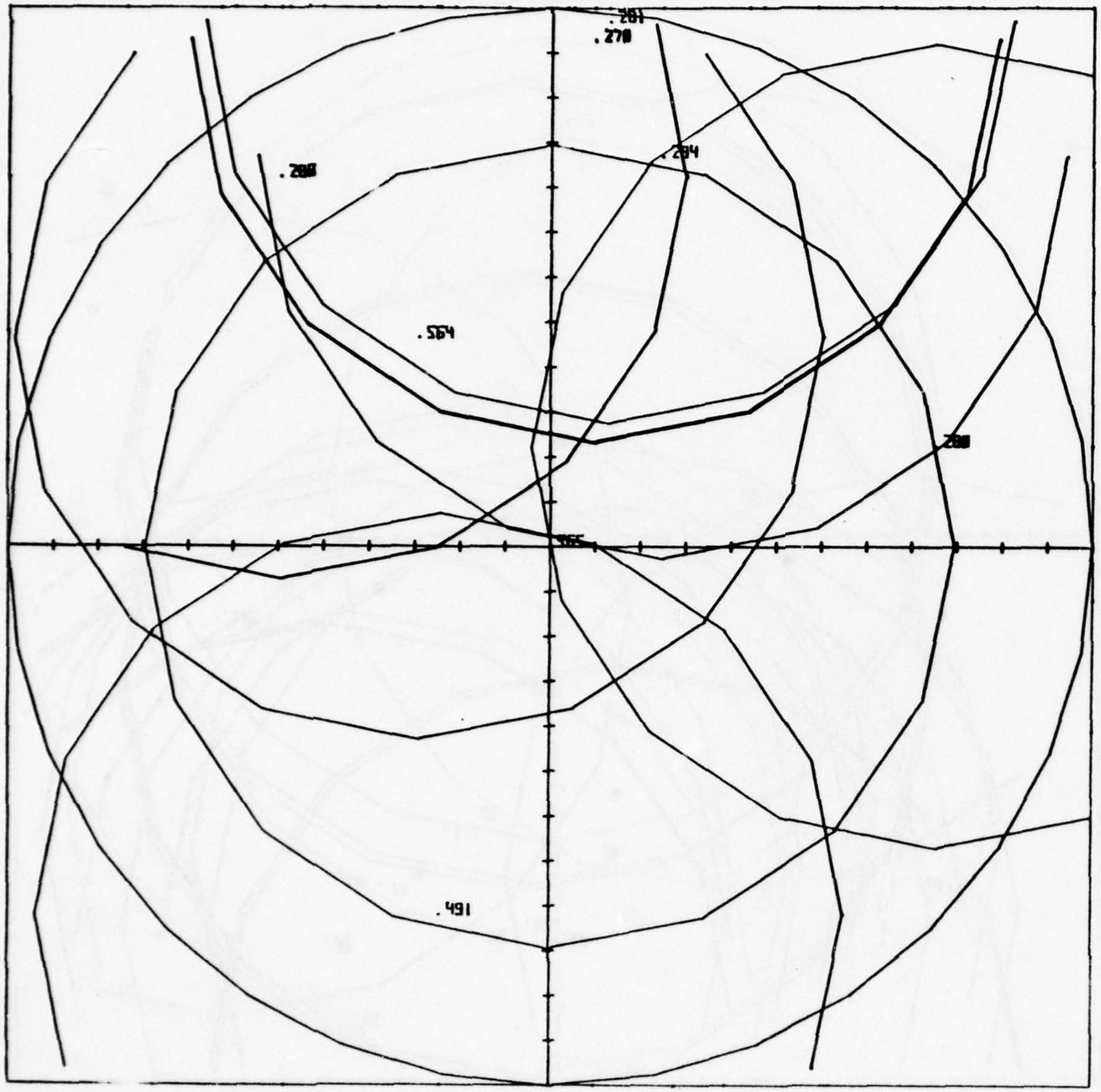


N C O

PROVIDENCE, R. I.

QUONSET PT.



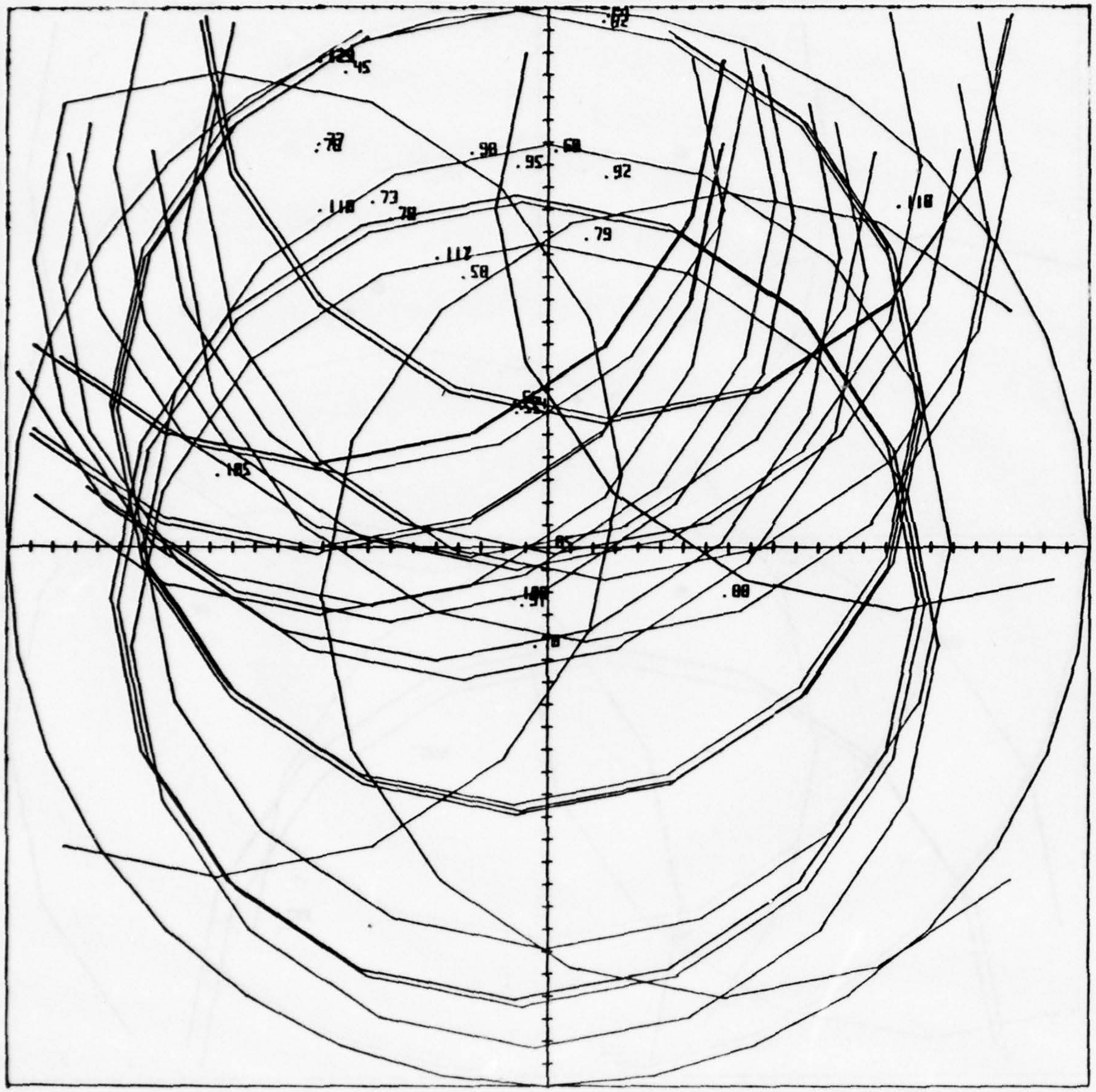
IGHT 1000   GIVES RADIUS 44.72135
ZE OF AREA RADIUS (NM) 60

LE # 565 USED AS NOMINAL SITE

RADAR # 278 WITHIN 56.67152692
RADAR # 279 WITHIN 56.49175019
RADAR # 280 WITHIN 44.10932596
RADAR # 281 WITHIN 58.85028342
RADAR # 284 WITHIN 45.13417363
RADAR # 286 WITHIN 50.76091693
RADAR # 287 WITHIN 50.76041693
RADAR # 491 WITHIN 42.78696207
RADAR # 564 WITHIN 27.40866523
RADAR # 565 WITHIN 0   NM
*** ***** ***** ***** *****

NKX

SAN DIEGO, CALIF.

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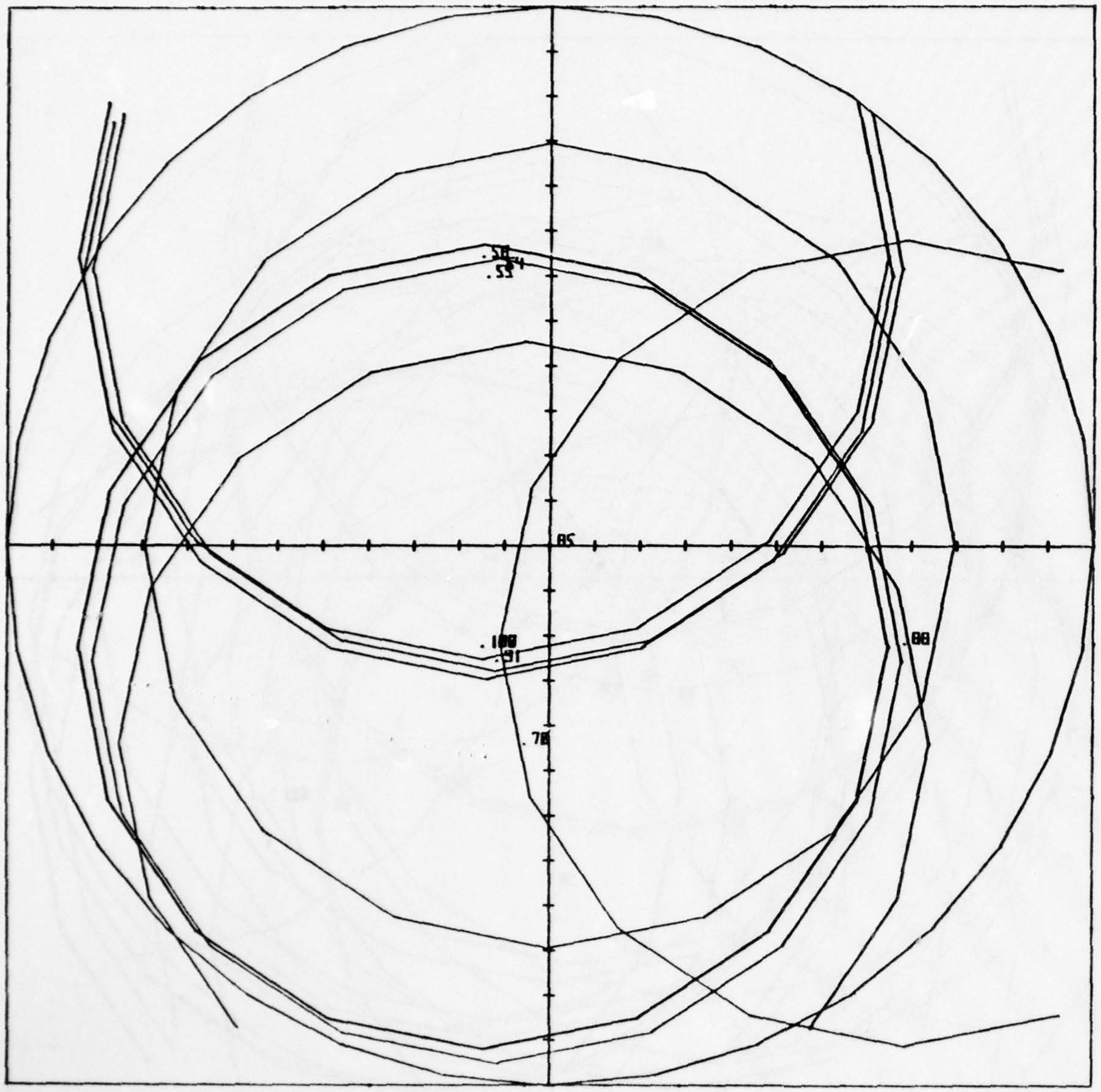
HEIGHT 4000    GIVES RADIUS 89.44271910
SIZE OF AREA  RADIUS (NM)> 120

SITE # 85   USED AS NOMINAL SITE

  RADAR # 45    WITHIN 114.6227082   |
  RADAR # 54    WITHIN 31.3423511    |
  RADAR # 55    WITHIN 30.71452367   |
  RADAR # 56    WITHIN 32.94995391   |
  RADAR # 58    WITHIN 62.8523891    |
  RADAR # 59    WITHIN 88.04541715   |
  RADAR # 60    WITHIN 88.04541715   |
  RADAR # 62    WITHIN 118.3415889   |
  RADAR # 63    WITHIN 117.6459779   |
  RADAR # 64    WITHIN 117.6459779   |
  RADAR # 70    WITHIN 22.19807206   |
  RADAR # 73    WITHIN 85.89254961   |
  RADAR # 74    WITHIN 80.7946223    |
  RADAR # 75    WITHIN 80.7946223    |
  RADAR # 76    WITHIN 101.9079166   |
  RADAR # 77    WITHIN 102.7046966   |
  RADAR # 79    WITHIN 68.95580023   |
  RADAR # 85    WITHIN 0     NM
  RADAR # 88    WITHIN 40.70711494   |
  RADAR # 91    WITHIN 14.08613105   |
  RADAR # 92    WITHIN 83.27297807   |
  RADAR # 95    WITHIN 84.77222407   |
  RADAR # 98    WITHIN 88.09639975   |
  RADAR # 105   WITHIN 74.08621782   |
  RADAR # 106   WITHIN 13.44451955   |
  RADAR # 107   WITHIN 13.44451955   |
  RADAR # 108   WITHIN 13.44451955   |
  RADAR # 110   WITHIN 90.01237064   |
  RADAR # 111   WITHIN 68.77638799   |
  RADAR # 112   WITHIN 68.77638799   |
  RADAR # 116   WITHIN 108.3861715   |
  RADAR # 117   WITHIN 108.3861715   |
  RADAR # 123   WITHIN 119.1520067   |
  RADAR # 124   WITHIN 118.9442066   |
  RADAR # 125   WITHIN 119.2996677   NM
*****  *****  *****  *****  *****
```

N K X

SAN DIEGO, CALIF.

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IGHT 1000    GIVES RADIUS 44.72135
ZE OF AREA  RADIUS (NM) 60

LE # 85   USED AS NOMINAL SITE

RADAR # 54   WITHIN 31.3423511
RADAR # 55   WITHIN 30.71452367
RADAR # 56   WITHIN 32.34995391
RADAR # 70   WITHIN 22.19807206
RADAR # 85   WITHIN 0     NM
RADAR # 88   WITHIN 40.70711494
RADAR # 91   WITHIN 14.08613105
RADAR # 106  WITHIN 13.44451955
RADAR # 107  WITHIN 13.44451955
RADAR # 108  WITHIN 13.44451955
***  *****  *****  *****  *****
```
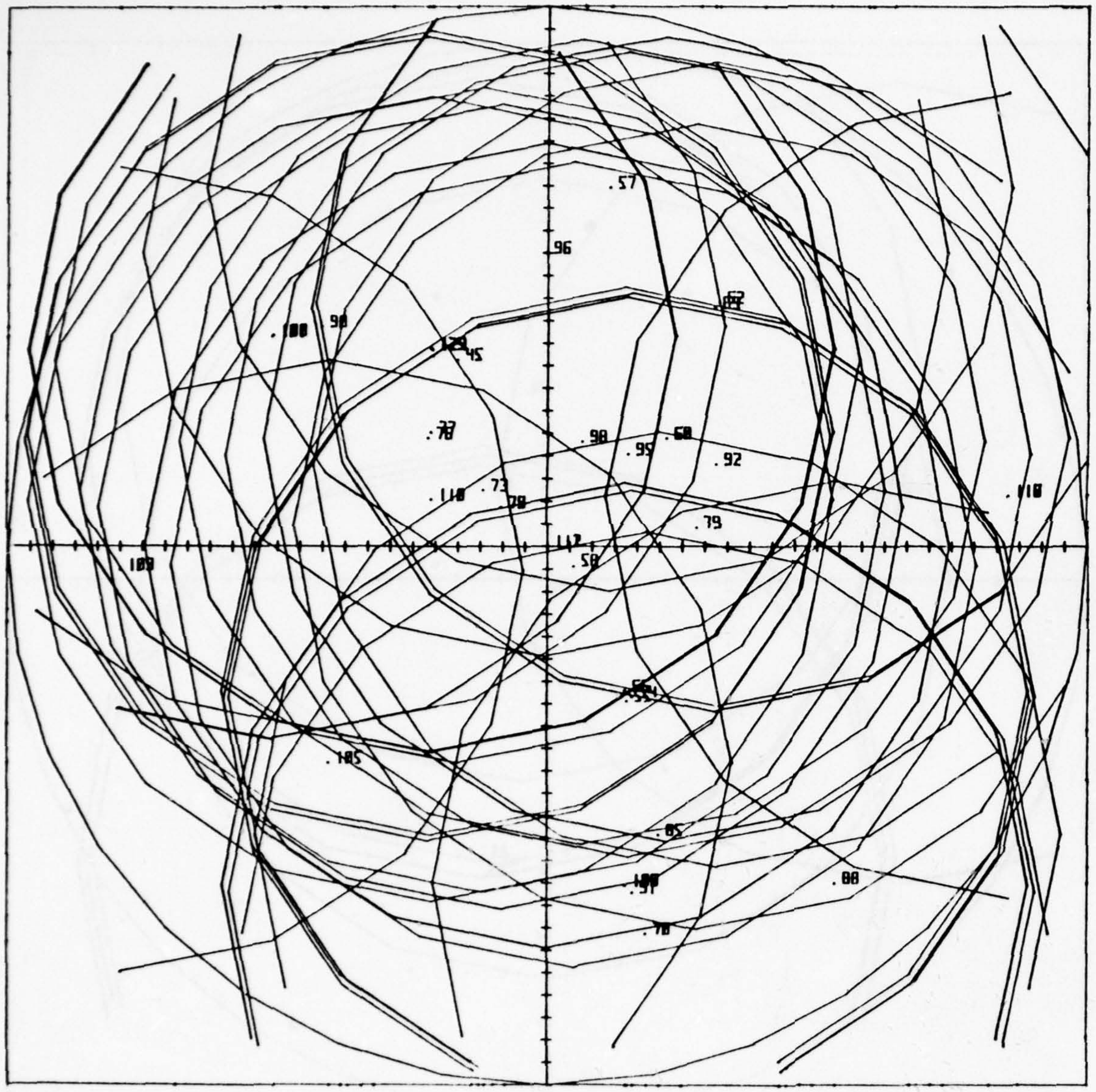



N Z J

SANTA ANA, CALIF.

HEIGHT 4000 GIVES RADIUS 89.44271910
SIZE OF AREA RADIUS (NM) 120

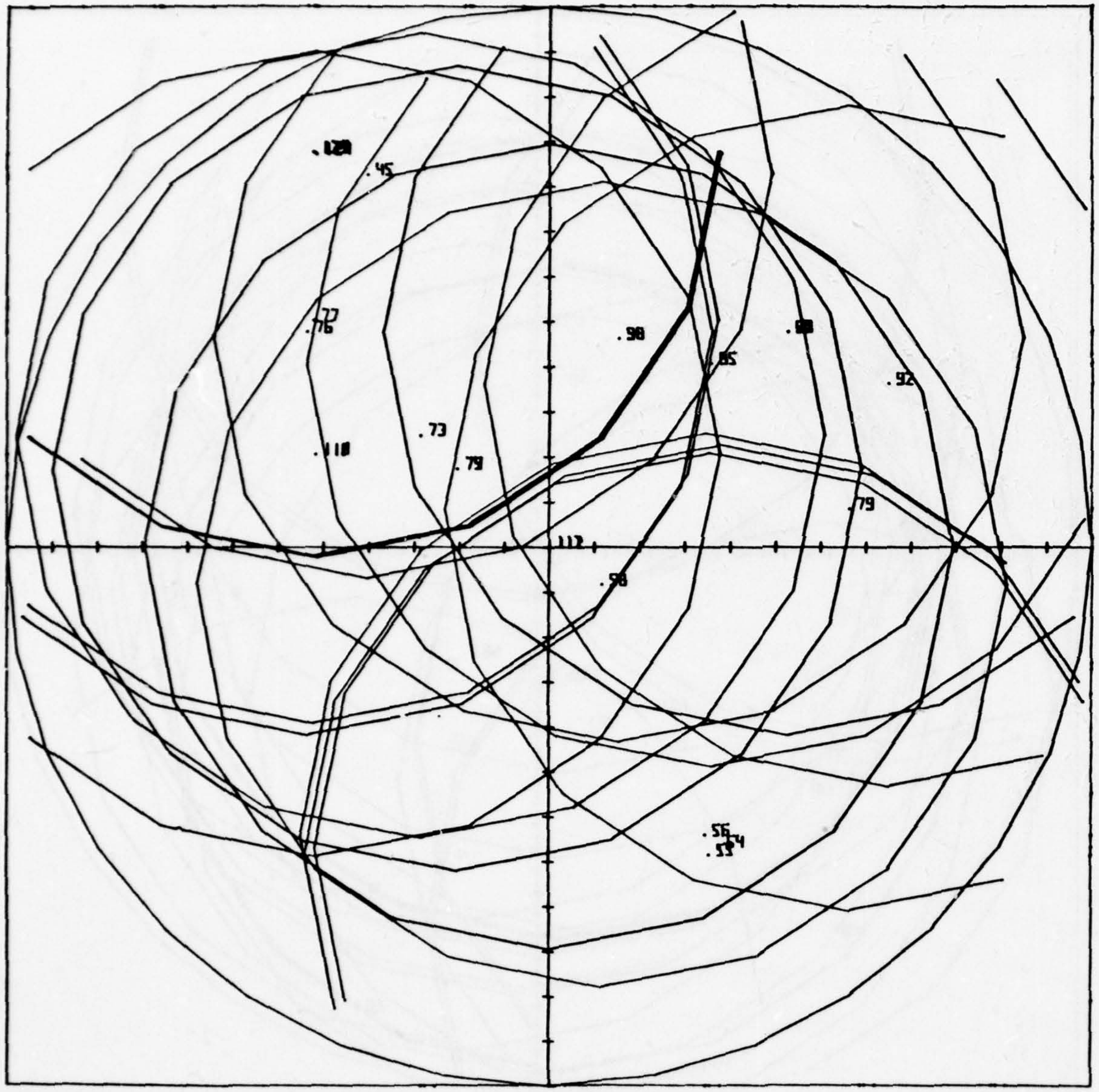
FILE # 111 USED AS NOMINAL SITE

RADAR # 45	WITHIN	45.94615406	NM
RADAR # 54	WITHIN	38.3549318	NM
RADAR # 55	WITHIN	38.58955705	NM
RADAR # 56	WITHIN	36.43903600	NM
RADAR # 57	WITHIN	80.79151114	NM
RADAR # 58	WITHIN	7.2313832	NM
RADAR # 59	WITHIN	35.57436862	NM
RADAR # 60	WITHIN	35.57436862	NM
RADAR # 62	WITHIN	66.07624156	NM
RADAR # 63	WITHIN	64.51876597	NM
RADAR # 64	WITHIN	64.51876597	NM
RADAR # 70	WITHIN	88.95971509	NM
RADAR # 73	WITHIN	10.87020109	NM
RADAR # 74	WITHIN	13.38907170	NM
RADAR # 75	WITHIN	13.38903170	NM
RADAR # 76	WITHIN	35.76318955	NM
RADAR # 77	WITHIN	36.16432179	NM
RADAR # 79	WITHIN	33.43203944	NM
RADAR # 85	WITHIN	68.77638799	NM
RADAR # 88	WITHIN	90.55967707	NM
RADAR # 90	WITHIN	69.85995034	NM
RADAR # 91	WITHIN	79.2989428	NM
RADAR # 92	WITHIN	41.63714087	NM
RADAR # 95	WITHIN	27.10821743	NM
RADAR # 96	WITHIN	65.05459982	NM
RADAR # 98	WITHIN	24.33722474	NM
RADAR # 100	WITHIN	76.74265508	NM
RADAR # 101	WITHIN	76.82530679	NM
RADAR # 105	WITHIN	68.90209950	NM
RADAR # 106	WITHIN	77.89727663	NM
RADAR # 107	WITHIN	77.89727663	NM
RADAR # 108	WITHIN	77.89727663	NM
RADAR # 109	WITHIN	95.00491067	NM
RADAR # 110	WITHIN	27.7382951	NM
RADAR # 111	WITHIN	0 NM	
RADAR # 112	WITHIN	0 NM	
RADAR # 116	WITHIN	103.1212768	NM
RADAR # 117	WITHIN	103.1212768	NM
RADAR # 123	WITHIN	50.77282953	NM
RADAR # 124	WITHIN	50.56465548	NM
RADAR # 125	WITHIN	50.94115114	NM

....

N Z J

SANTA ANA, CALIF.



HEIGHT 1000 GIVES RADIUS 44.72135955
SIZE OF AREA RADIUS (NM) 60

SITE # 111 USED AS NOMINAL SITE

RADAR #	45	WITHIN	45.94615406	NM
RADAR #	54	WITHIN	38.3539318	NM
RADAR #	55	WITHIN	38.58955765	NM
RADAR #	56	WITHIN	36.43903360	NM
RADAR #	58	WITHIN	7.2313832	NM
RADAR #	59	WITHIN	35.57436062	NM
RADAR #	60	WITHIN	35.57436862	NM
RADAR #	73	WITHIN	18.87020109	
RADAR #	74	WITHIN	13.38963170	
RADAR #	75	WITHIN	13.38963170	
RADAR #	76	WITHIN	35.76318955	
RADAR #	77	WITHIN	36.16432179	
RADAR #	79	WITHIN	33.43307444	
RADAR #	92	WITHIN	41.63714047	
RADAR #	95	WITHIN	27.10821743	
RADAR #	98	WITHIN	24.33722474	
RADAR #	110	WITHIN	27.7482951	
RADAR #	111	WITHIN	0	NM
RADAR #	112	WITHIN	0	NM
RADAR #	123	WITHIN	50.77785753	NM
RADAR #	124	WITHIN	50.56425548	NM
RADAR #	125	WITHIN	50.94135114	NM

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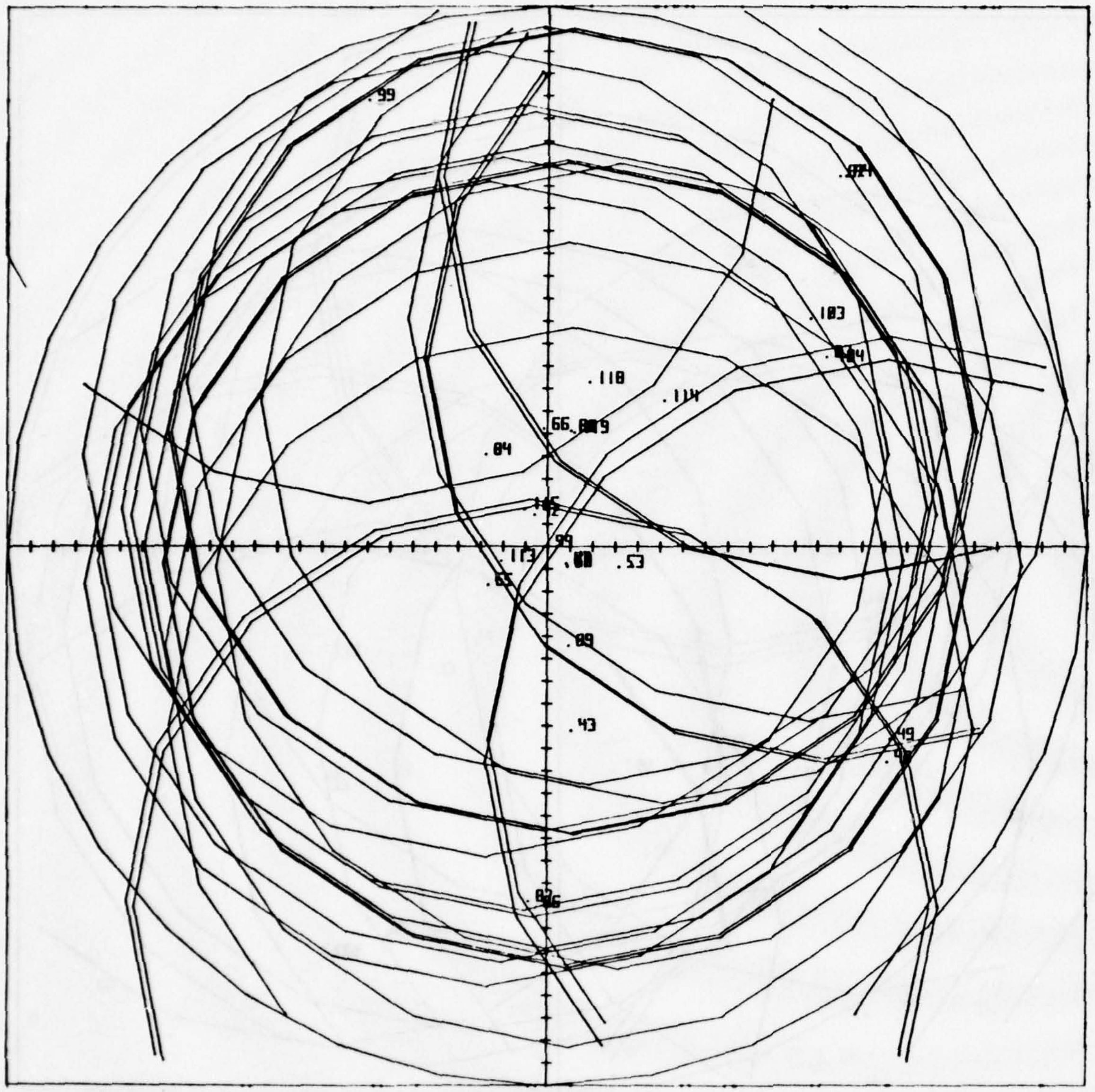


O A K

OAKLAND, CALIF.

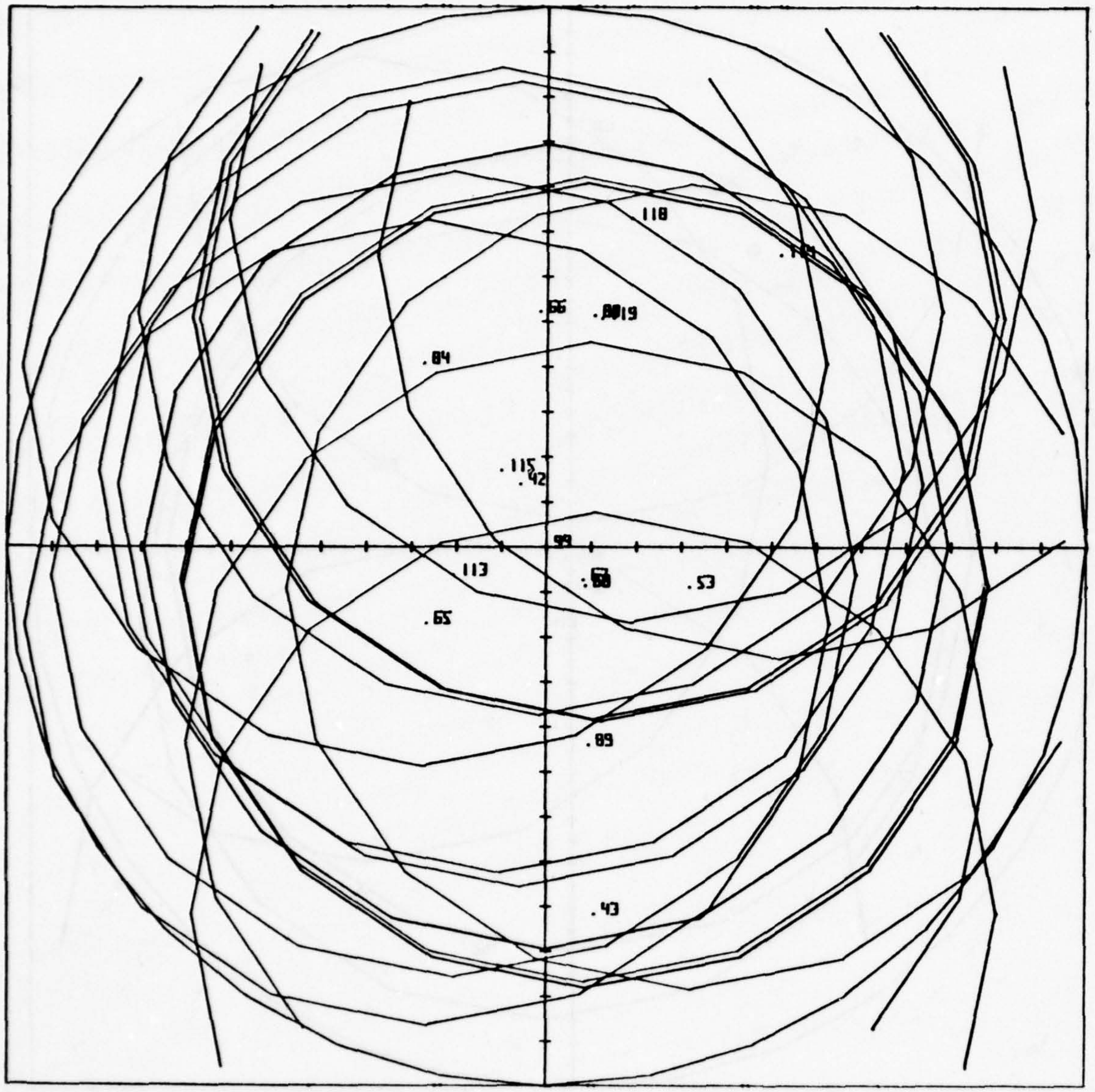
HEIGHT 4000   GIVES RADIUS 89.44271910
SIZE OF AREA (RADIUS (NM)) 120

[illegible]E # 94 USED AS NOMINAL SITE

RADAR # 42	WITHIN	7.537700948	!
RADAR # 43	WITHIN	41.2418[illegible]	!
RADAR # 44	WITHIN	105.5858073	!
RADAR # 47	WITHIN	89.6651785	!
RADAR # 48	WITHIN	89.6819168	!
RADAR # 49	WITHIN	87.5[illegible]74257	!
RADAR # 53	WITHIN	16.5[illegible]3028	!
RADAR # 65	WITHIN	15.73248016	!
RADAR # 66	WITHIN	26.06794707	!
RADAR # 67	WITHIN	5.574982229	!
RADAR # 68	WITHIN	6.217671656	!
RADAR # 69	WITHIN	6.217671656	!
RADAR # 80	WITHIN	26.15013983	!
RADAR # 81	WITHIN	26.15013983	!
RADAR # 82	WITHIN	104.7046444	!
RADAR # 83	WITHIN	74.96003992	!
RADAR # 84	WITHIN	24.51727642	!
RADAR # 86	WITHIN	80.28250505	!
RADAR # 87	WITHIN	79.00406693	!
RADAR # 89	WITHIN	22.51924196	!
RADAR # 93	WITHIN	0 NM	
RADAR # 94	WITHIN	0 NM	
RADAR # 99	WITHIN	106.7584135	!
RADAR # 103	WITHIN	77.27827822	!
RADAR # 104	WITHIN	75.03399074	!
RADAR # 113	WITHIN	10.74[illegible]42	!
RADAR # 114	WITHIN	41.4308[illegible]38	!
RADAR # 115	WITHIN	9.875[illegible]69	!
RADAR # 118	WITHIN	[illegible]7.5[illegible]500[illegible]	!
RADAR # 119	WITHIN	26.06815317	NM

O A K

OAKLAND, CALIF.



HEIGHT 1000 GIVES RADIUS 44.721359
SIZE OF AREA RADIUS (NM) 60

CELL # 94 USED AS NOMINAL SITE

RADAR	# 42	WITHIN	7.537700948
RADAR	# 43	WITHIN	41.2418492
RADAR	# 53	WITHIN	16.57452028
RADAR	# 65	WITHIN	15.78248316
RADAR	# 66	WITHIN	26.06794787
RADAR	# 67	WITHIN	5.574982229
RADAR	# 68	WITHIN	6.217671656
RADAR	# 69	WITHIN	6.217671656
RADAR	# 80	WITHIN	26.15013983
RADAR	# 81	WITHIN	26.15013983
RADAR	# 84	WITHIN	24.51737642
RADAR	# 89	WITHIN	22.51524196
RADAR	# 93	WITHIN	0 NM
RADAR	# 94	WITHIN	0 NM
RADAR	# 113	WITHIN	10.74952642
RADAR	# 114	WITHIN	41.40308838
RADAR	# 115	WITHIN	9.075106969
RADAR	# 118	WITHIN	37.55400027
RADAR	# 119	WITHIN	26.06815317

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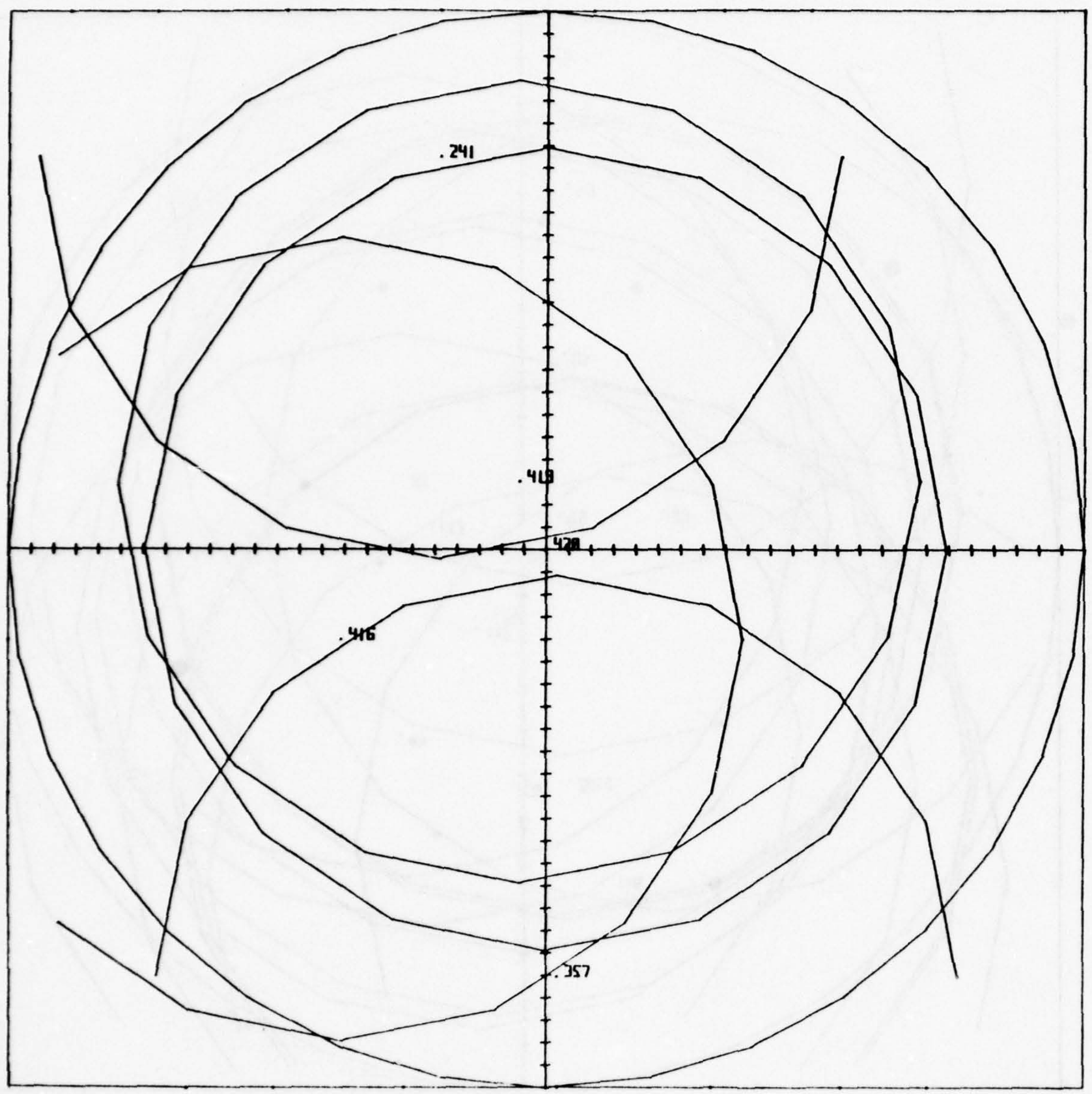

O F F

OMAHA, NEB.
OFFUTT AFB

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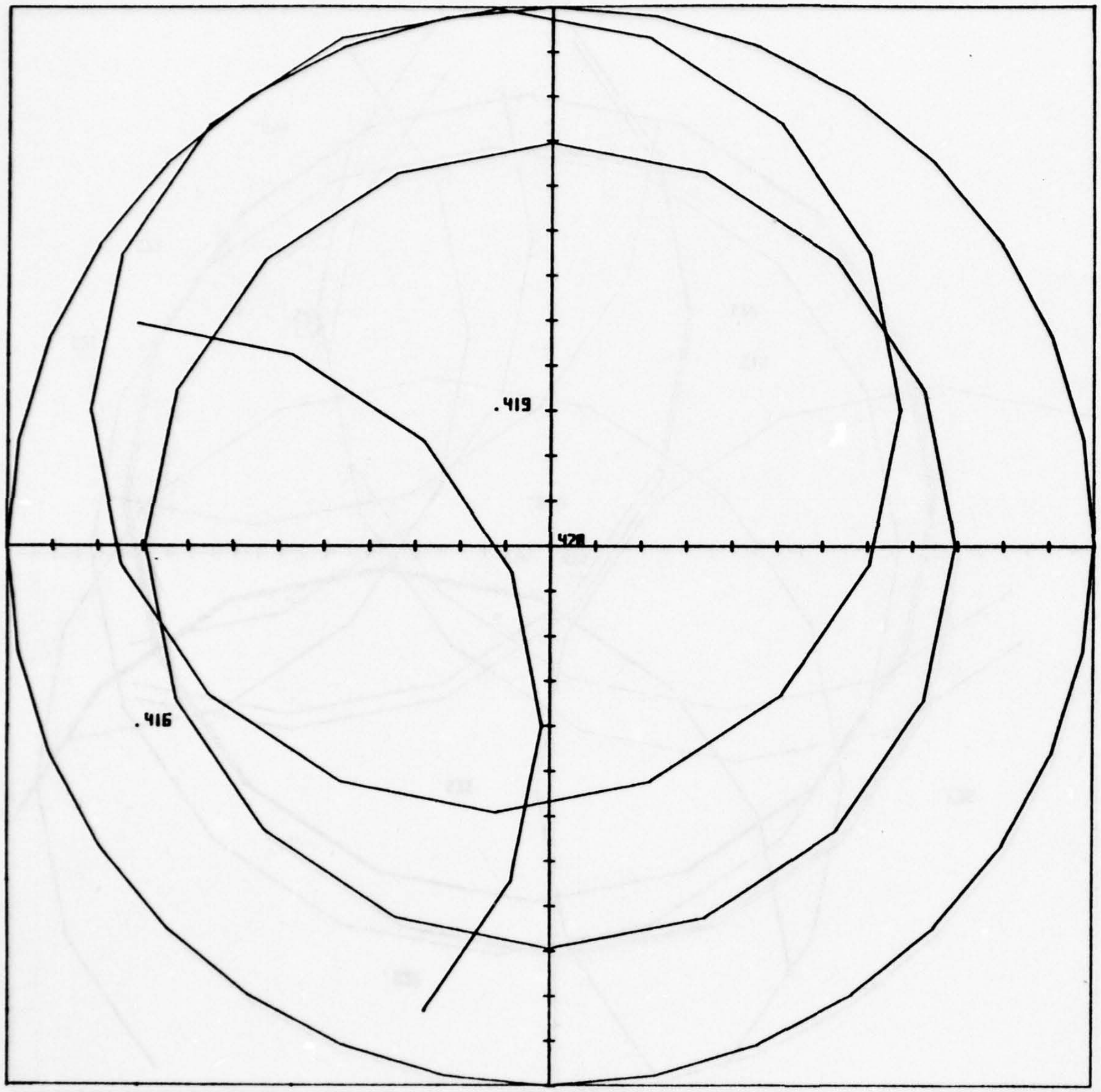
..OUT 4000     GIVES RADIUS 89.44271
..I OF AREA  RADIUS (NM) 120

II # 420  USED AS NOMINAL SITE

RADAR # 241  WITHIN 90.58980144
RADAR # 357  WITHIN 95.25946427
RADAR # 416  WITHIN 49.81879624
RADAR # 419  WITHIN 16.26899295
RADAR # 420  WITHIN 0     NM
***  *****  *****  *****  *****
```



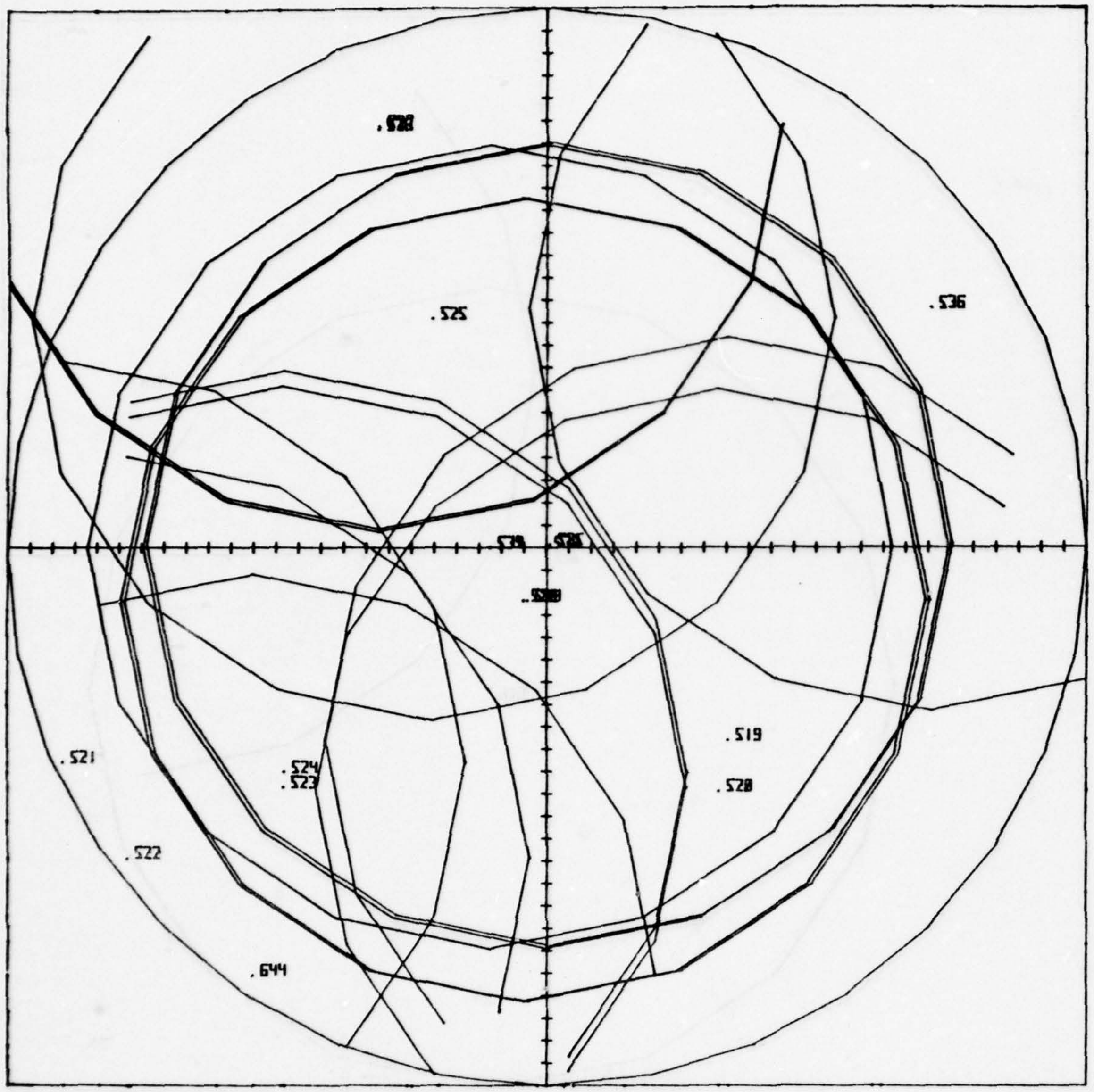
O F F

OMAHA, NEB.
OFFUTT AFB

IGHT 1000 GIVES RADIUS 44.7213
ZE OF AREA (RADIUS (NM)) 60

LE # 420 USED AS NOMINAL SITE

RADAR # 416 WITHIN 49.01879624
RADAR # 419 WITHIN 16.26899295
RADAR # 420 WITHIN 0 NM
*** ***** ***** ***** *****



O K C

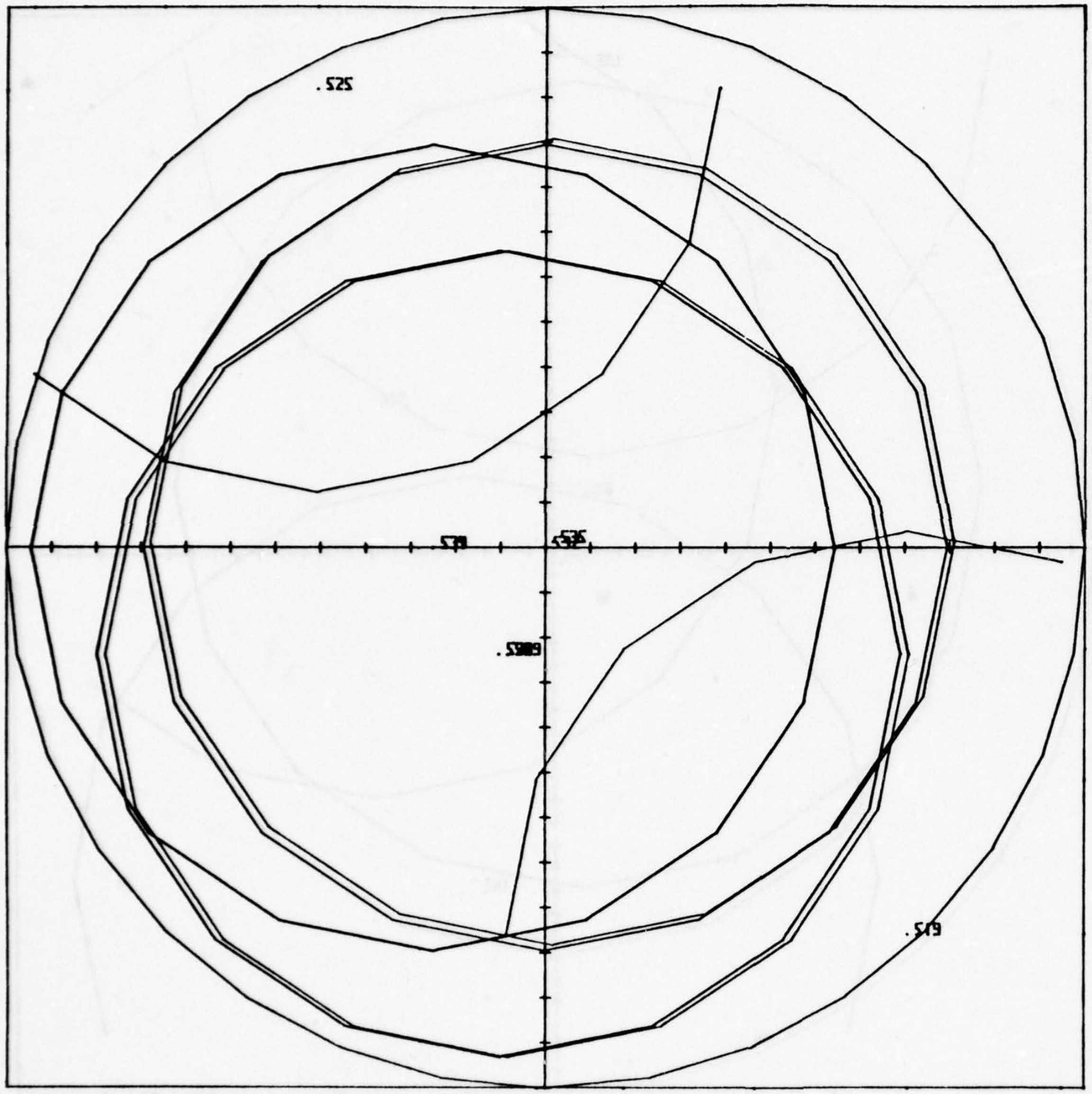
OKLAHOMA CITY, OKLAHOMA

''IGHT 4000 GIVES RADIUS 89.4427
1ZE OF AREA (RADIUS (NM)) 120

ILE # 532 USED AS NOMINAL SITE

RADAR # 519	WITHIN	58.89623321	•	
RADAR # 520	WITHIN	66.45350354		
RADAR # 521	WITHIN	117.7745094		
RADAR # 522	WITHIN	116.2661285		
RADAR # 523	WITHIN	79.37160817		
RADAR # 524	WITHIN	76.920634	NM	
RADAR # 525	WITHIN	56.86040962		
RADAR # 526	WITHIN	100.1163208		
RADAR # 527	WITHIN	100.6666998		
RADAR # 528	WITHIN	12.91589217		
RADAR # 529	WITHIN	12.59487453		
RADAR # 530	WITHIN	12.91589217		
RADAR # 531	WITHIN	12.54303564		
RADAR # 532	WITHIN	0	NM	
RADAR # 533	WITHIN	12.54303564		
RADAR # 534	WITHIN	12.525141		|
RADAR # 535	WITHIN	1.029542731		|
RADAR # 536	WITHIN	100.6478613		|
RADAR # 644	WITHIN	115.6007329		|

*** ***** ***** ***** *****



O K C

OKLAHOMA CITY, OKLAHOMA

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HEIGHT  ...          :  ........ ....135955
SIZE OF AREA  RADIUS (NM) > 60

FILE # 532  USED AS NOMINAL SITE

   RADAR # 519   WITHIN 58.89623321    NM
   RADAR # 525   WITHIN 56.86040962    NM
   RADAR # 528   WITHIN 12.91589217    NM
   RADAR # 529   WITHIN 12.59487453    NM
   RADAR # 530   WITHIN 12.91589217    NM
   RADAR # 531   WITHIN 12.54303564    NM
   RADAR # 532   WITHIN 0    NM
   RADAR # 533   WITHIN 12.54303564    NM
   RADAR # 534   WITHIN 12.5725141     NM
   RADAR # 535   WITHIN 1.029542731    NM
*****  *****  *****  *****  *****
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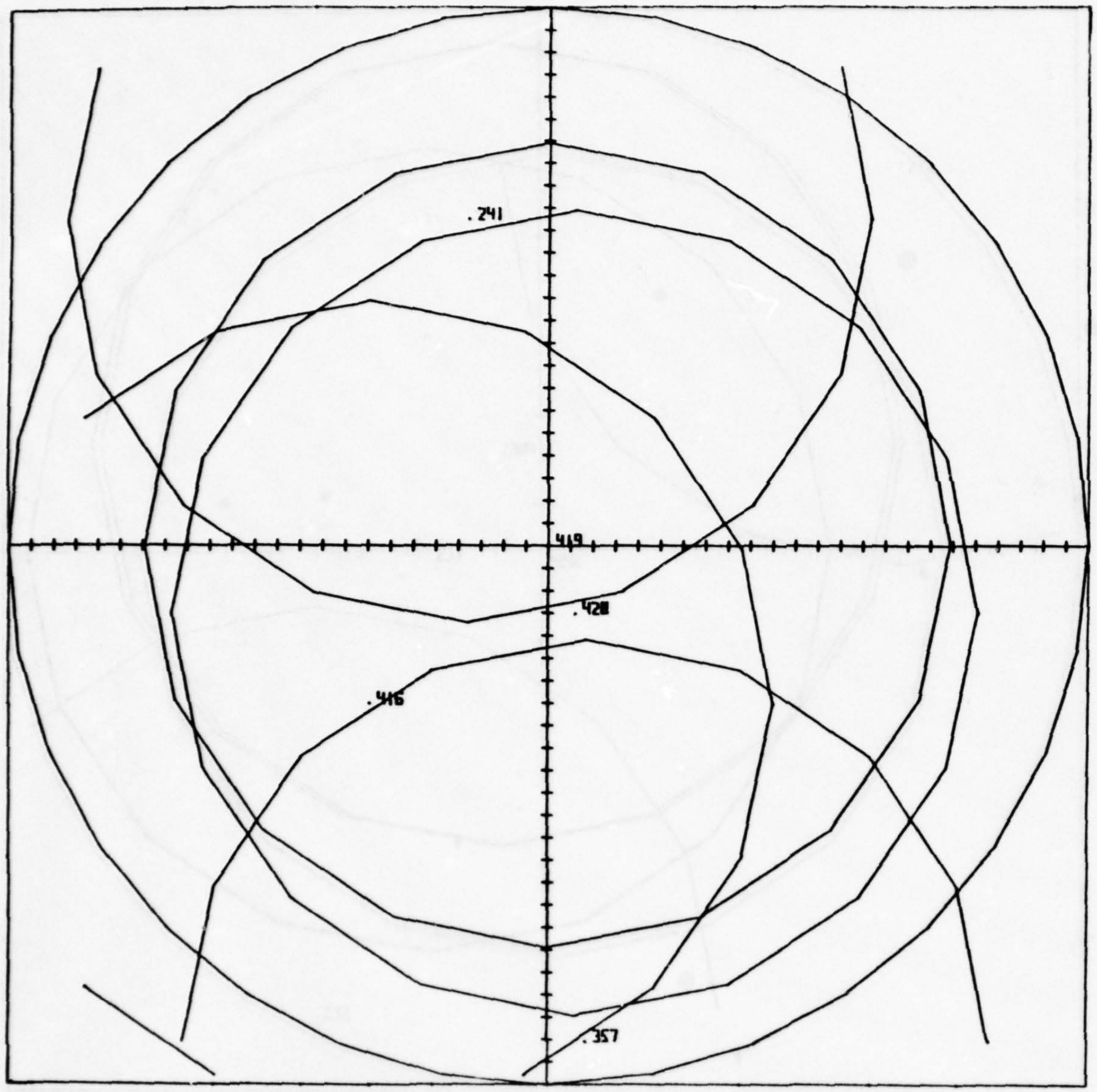
O M A

OMAHA, NEB.



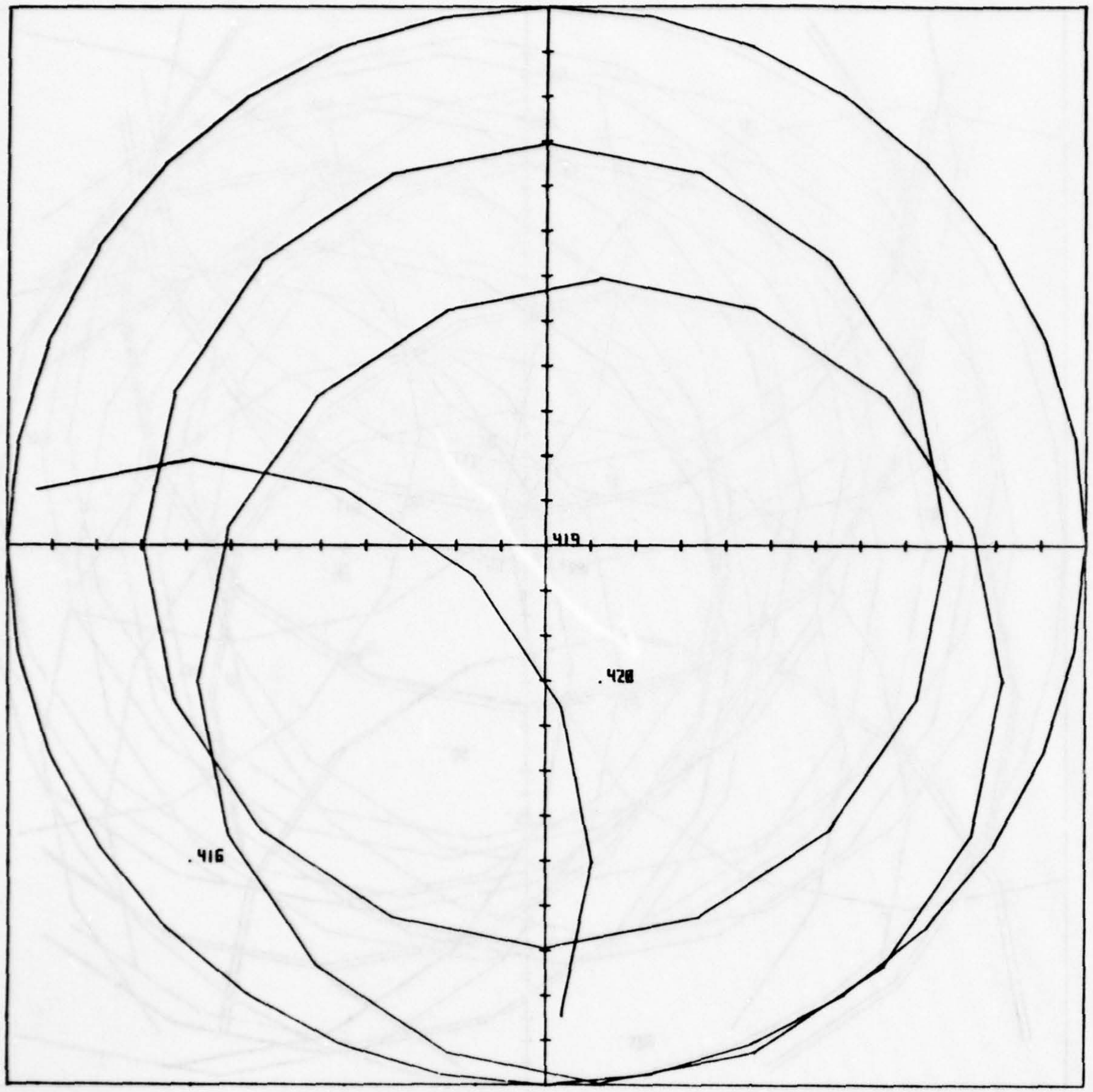
LOAD 4000 GIVES RADIUS 89.4427
.E OF AREA RADIUS (NM) 120

[illegible] # 419 USED AS NOMINAL SITE

RADAR # 241 WITHIN 74.45898635
RADAR # 357 WITHIN 110.64251 NM
RADAR # 416 WITHIN 52.80285842
RADAR # 419 WITHIN 0 NM
RADAR # 420 WITHIN 16.26899295
*** ***** ***** ***** *****

O M A

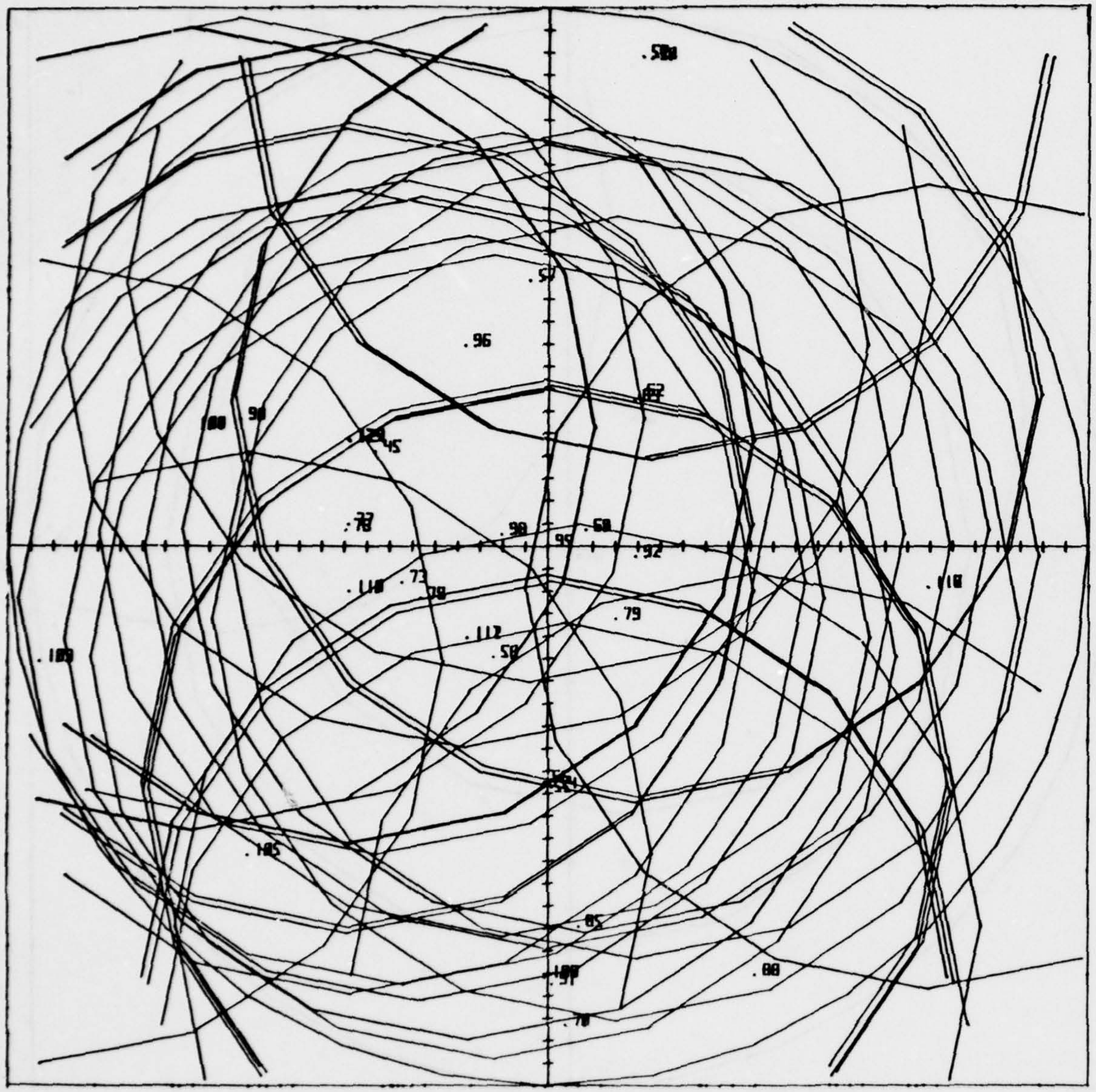
OMAHA, NEB.



IGHT 1000   GIVES RADIUS 44.721359
ZE OF AREA RADIUS (NM) 60

E # 419 USED AS NOMINAL SITE

RADAR # 416 WITHIN 52.88285842
RADAR # 419 WITHIN 0   NM
RADAR # 420 WITHIN 16.26899295
**   ***** ***** ***** *****



O N T

ONTARIO, CALIF.
RIVERSIDE, CALIF.

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HEIGHT 4000    GIVES RADIUS 89.44271910
SIZE OF AREA (RADIUS (NM)) 120

FILE # 95   USED AS NOMINAL SITE
```

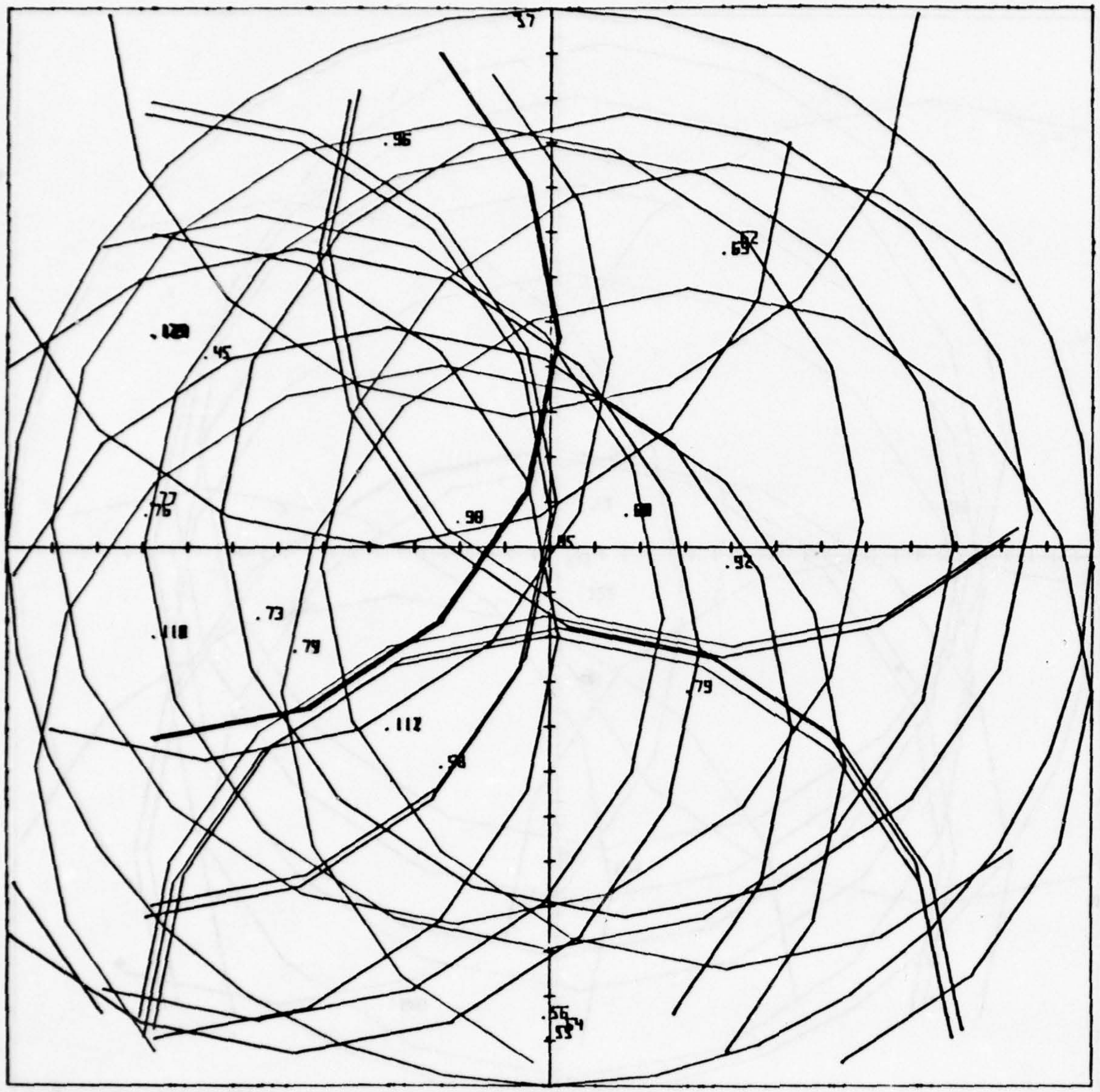
RADAR # 45	WITHIN 43.45127468	
RADAR # 50	WITHIN 110.933	NM
RADAR # 51	WITHIN 111.0452137	
RADAR # 52	WITHIN 111.0452137	
RADAR # 54	WITHIN 53.71634720	
RADAR # 55	WITHIN 54.58969368	
RADAR # 56	WITHIN 52.40611767	
RADAR # 57	WITHIN 59.40842325	
RADAR # 58	WITHIN 27.348683	NM
RADAR # 59	WITHIN 9.160534566	
RADAR # 60	WITHIN 9.160534566	
RADAR # 62	WITHIN 39.24185981	
RADAR # 63	WITHIN 37.70005388	
RADAR # 64	WITHIN 37.70005388	
RADAR # 70	WITHIN 106.6026558	
RADAR # 73	WITHIN 33.17372055	
RADAR # 74	WITHIN 30.44922418	
RADAR # 75	WITHIN 30.44922418	
RADAR # 76	WITHIN 44.75929993	
RADAR # 77	WITHIN 44.22470619	
RADAR # 79	WITHIN 22.12707374	
RADAR # 85	WITHIN 84.77222407	
RADAR # 88	WITHIN 105.8331679	
RADAR # 90	WITHIN 73.75141123	
RADAR # 91	WITHIN 97.33700091	
RADAR # 92	WITHIN 19.6762458	
RADAR # 95	WITHIN 0	NM
RADAR # 96	WITHIN 48.34817357	
RADAR # 98	WITHIN 10.57871549	
RADAR # 100	WITHIN 83.17695961	
RADAR # 101	WITHIN 83.35185176	
RADAR # 105	WITHIN 95.40862344	
RADAR # 106	WITHIN 95.74918852	
RADAR # 107	WITHIN 95.74918852	
RADAR # 108	WITHIN 95.74918852	
RADAR # 109	WITHIN 115.6814971	
RADAR # 110	WITHIN 44.89102032	
RADAR # 111	WITHIN 27.10821743	
RADAR # 112	WITHIN 27.10821743	
RADAR # 116	WITHIN 85.03680695	
RADAR # 117	WITHIN 85.03680695	
RADAR # 123	WITHIN 49.63292413	
RADAR # 124	WITHIN 49.42663464	
RADAR # 125	WITHIN 49.85398825	NM

`***** ***** ***** ***** *****`

O N T

ONTARIO, CALIF.

RIVERSIDE, CALIF.



HEIGHT 1000 GIVES RADIUS 44.72135955
SIZE OF AREA RADIUS (NM) 60

FILE # 95 USED AS NOMINAL SITE

RADAR # 45	WITHIN	43.45127468	
RADAR # 54	WITHIN	53.71604720	
RADAR # 55	WITHIN	54.58969368	
RADAR # 56	WITHIN	52.40611767	
RADAR # 57	WITHIN	59.40842325	
RADAR # 58	WITHIN	27.348883	NM
RADAR # 59	WITHIN	9.160534566	
RADAR # 60	WITHIN	9.160534566	
RADAR # 62	WITHIN	39.24185981	
RADAR # 63	WITHIN	37.70005388	
RADAR # 64	WITHIN	37.70005388	
RADAR # 73	WITHIN	33.17372055	
RADAR # 74	WITHIN	30.44922418	
RADAR # 75	WITHIN	30.44922418	
RADAR # 76	WITHIN	44.75929993	
RADAR # 77	WITHIN	44.22470619	
RADAR # 79	WITHIN	22.12707374	
RADAR # 92	WITHIN	19.6762458	
RADAR # 95	WITHIN	0	NM
RADAR # 96	WITHIN	48.34817357	
RADAR # 98	WITHIN	10.57871549	
RADAR # 110	WITHIN	44.89102092	
RADAR # 111	WITHIN	27.10821743	
RADAR # 112	WITHIN	27.10821743	
RADAR # 123	WITHIN	49.[illegible]	
RADAR # 124	WITHIN	49.4[illegible]964	
RADAR # 125	WITHIN	19.85398025	

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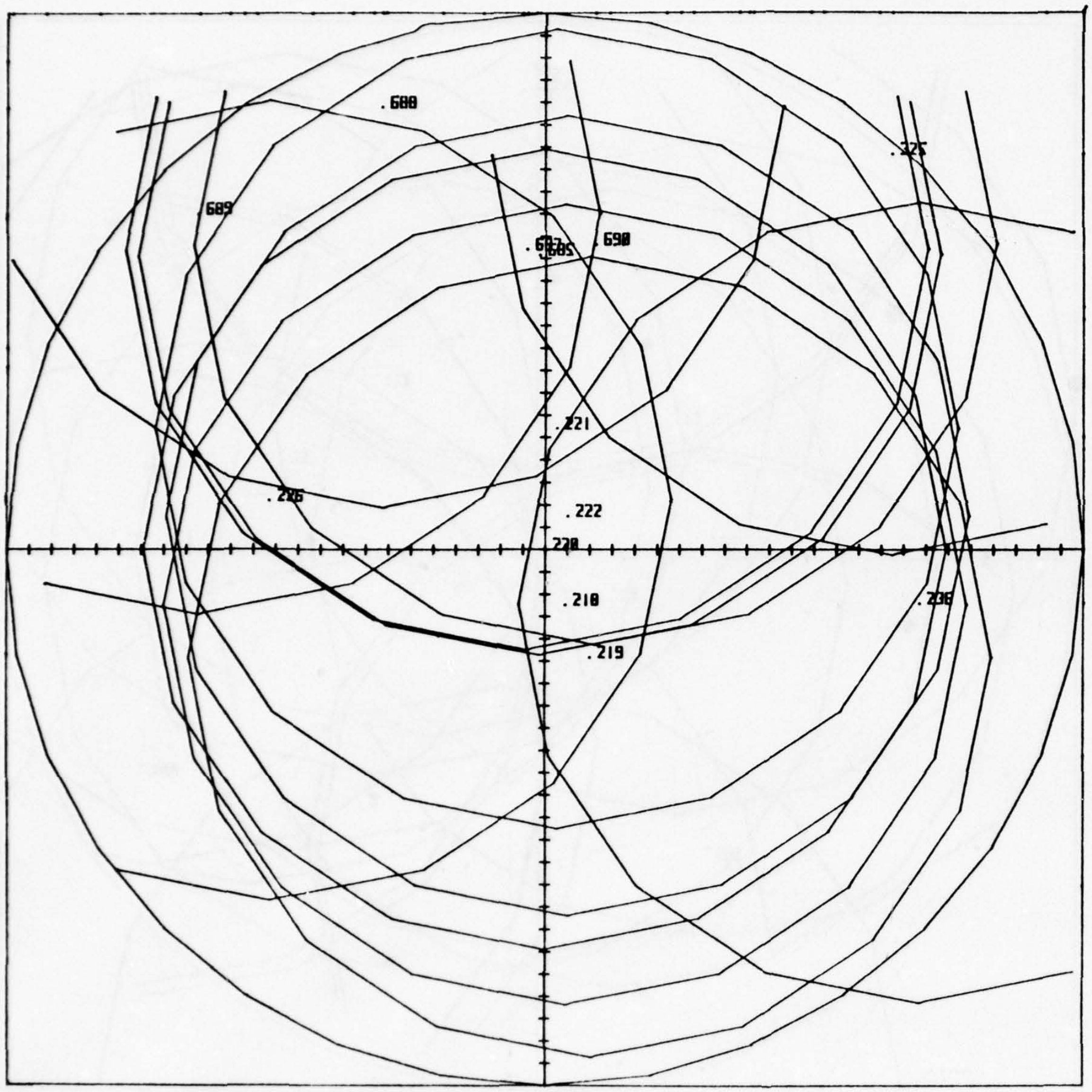

O R D

CHICAGO O'HARE, ILL.

```
IGHT 4000    GIVES RADIUS 89.442719
ZE OF AREA (RADIUS (NM) 120

LE # 220  USED AS NOMINAL SITE

RADAR # 218  WITHIN 13.18282779   NM
RADAR # 219  WITHIN 26.15562449   N
RADAR # 220  WITHIN 0     NM
RADAR # 221  WITHIN 27.09374537   N
RADAR # 222  WITHIN 9.007936134   N
RADAR # 226  WITHIN 62.22786884   N
RADAR # 236  WITHIN 84.37833586   N
RADAR # 325  WITHIN 117.479143    N
RADAR # 685  WITHIN 65.81178424   N
RADAR # 687  WITHIN 67.11099014   N
RADAR # 688  WITHIN 105.2957194   N
RADAR # 689  WITHIN 107.619016    N
RADAR # 690  WITHIN 69.03507464   N
*****  *****  *****  *****  *****
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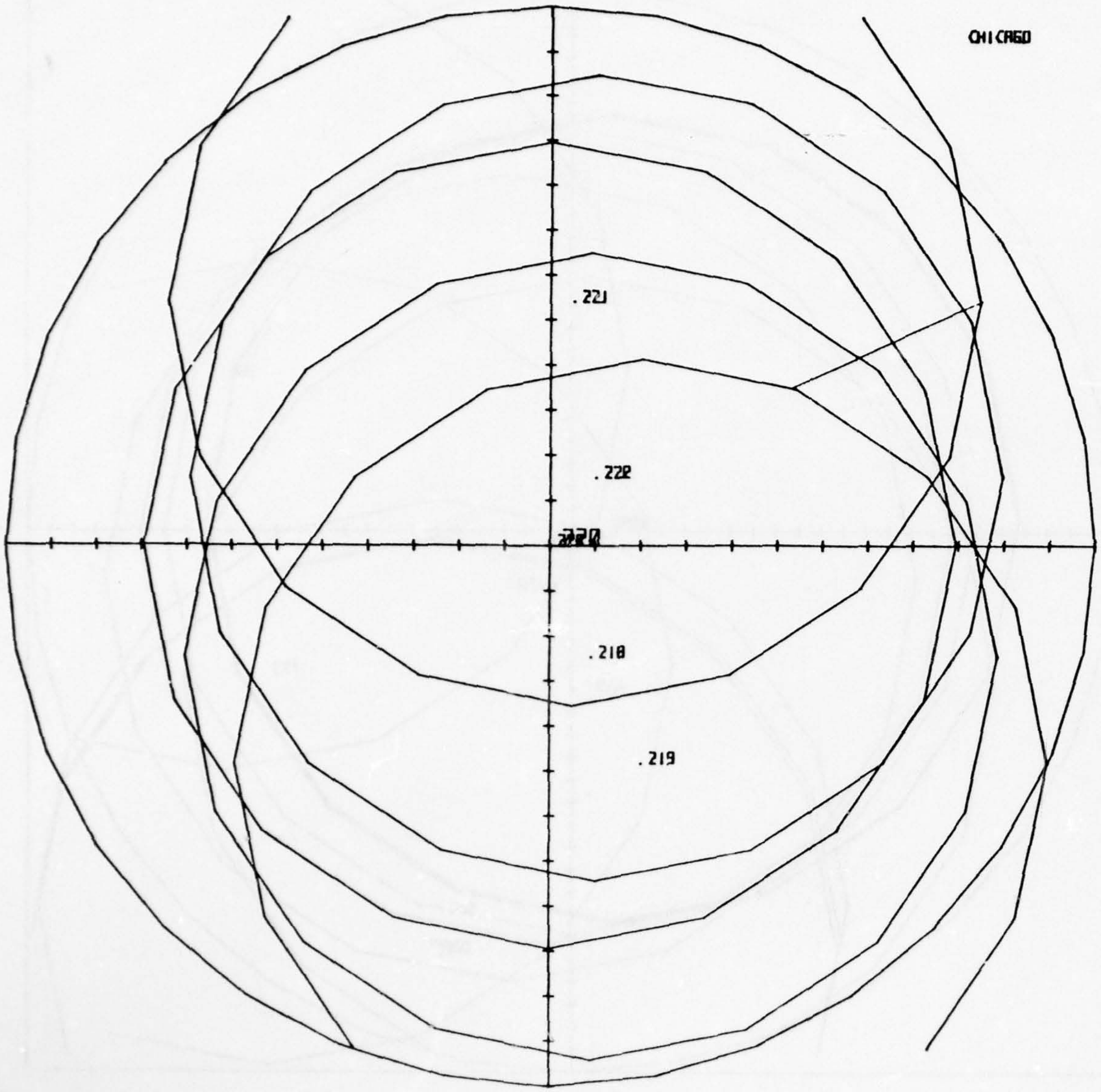
O R D

CHICAGO O'HARE, ILL.

NM [illegible] .72135955
[illegible] (NM) 60

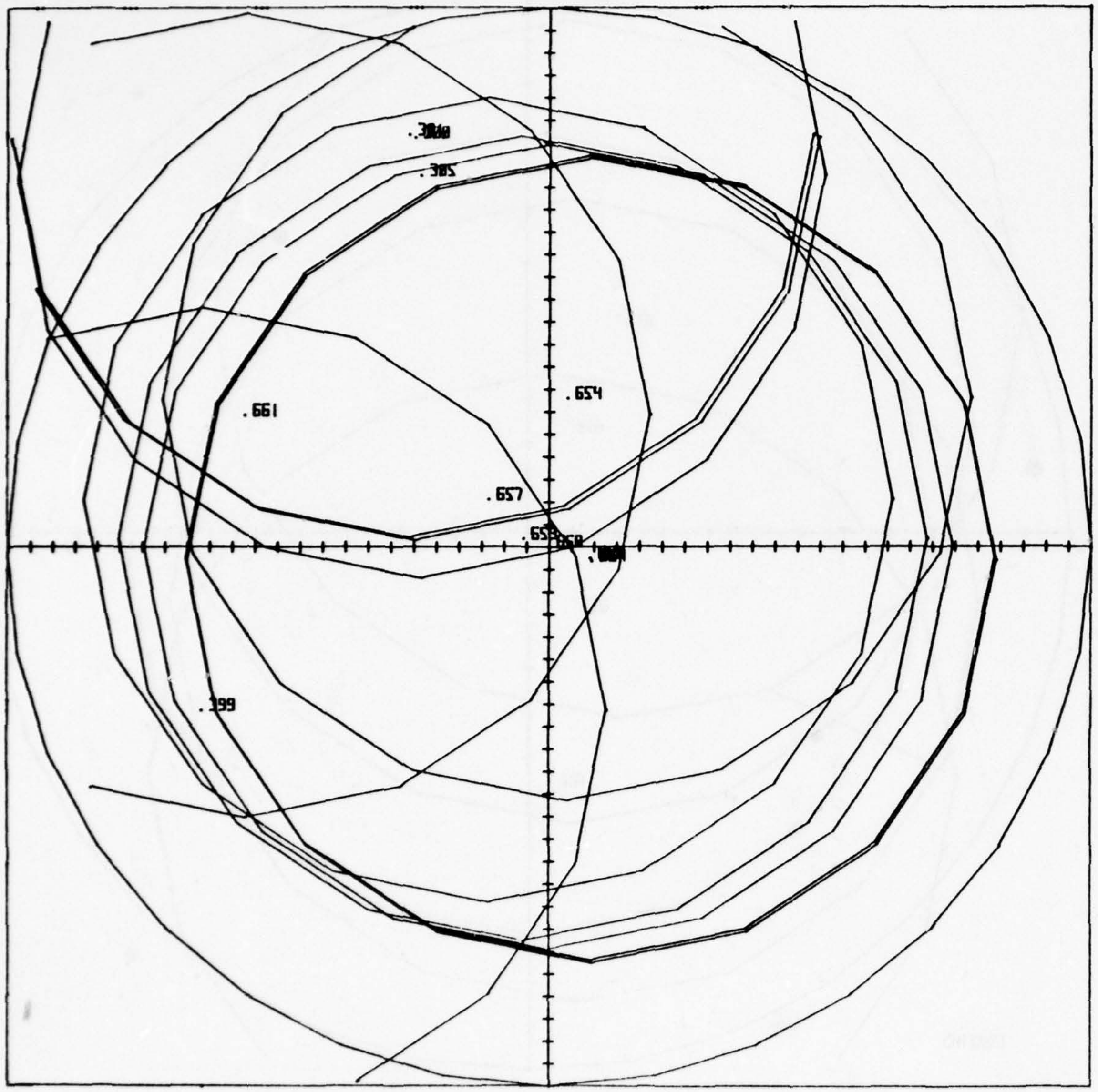
FILE # 220 USED AS NOMINAL SITE

FROM # 218 WITHIN 13.18282779 NM
FROM # 219 WITHIN 26.15562449 NM
FROM # 220 WITHIN 0 NM
FROM # 221 WITHIN 27.[illegible]4537 NM
FROM # 222 WITHIN [illegible]134 NM
***** [illegible] *****



O R F

NORFOLK, VA.



D-120

IGHT 4000   GIVES RADIUS 89.442719
I.E OF AREA (RADIUS (NM)) 120

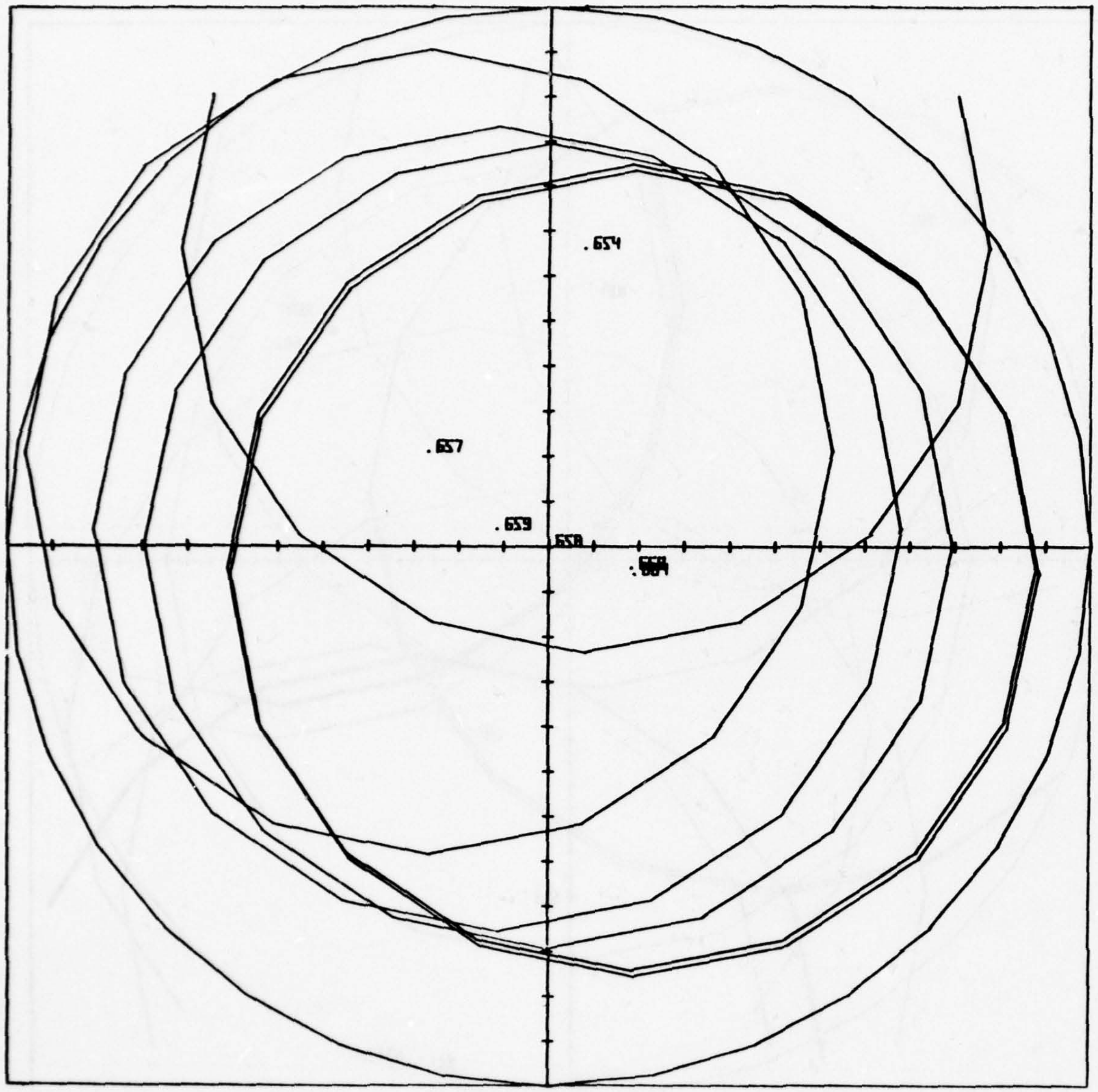
ILE # 658 USED AS NOMINAL SITE

RADAR #	300	WITHIN	95.67806486	N
RADAR #	301	WITHIN	96.70218583	I
RADAR #	305	WITHIN	87.28855044	N
RADAR #	399	WITHIN	84.84560013	N
RADAR #	654	WITHIN	33.1929741	N
RADAR #	656	WITHIN	9.543133611	N
RADAR #	657	WITHIN	16.90148124	N
RADAR #	658	WITHIN	0	NM
RADAR #	659	WITHIN	5.921307362	I
RADAR #	661	WITHIN	73.20605842	I
RADAR #	663	WITHIN	9.543133611	I
RADAR #	664	WITHIN	10.0492767	I

***** ***** ***** ***** *****

O R F

NORFOLK, VA.



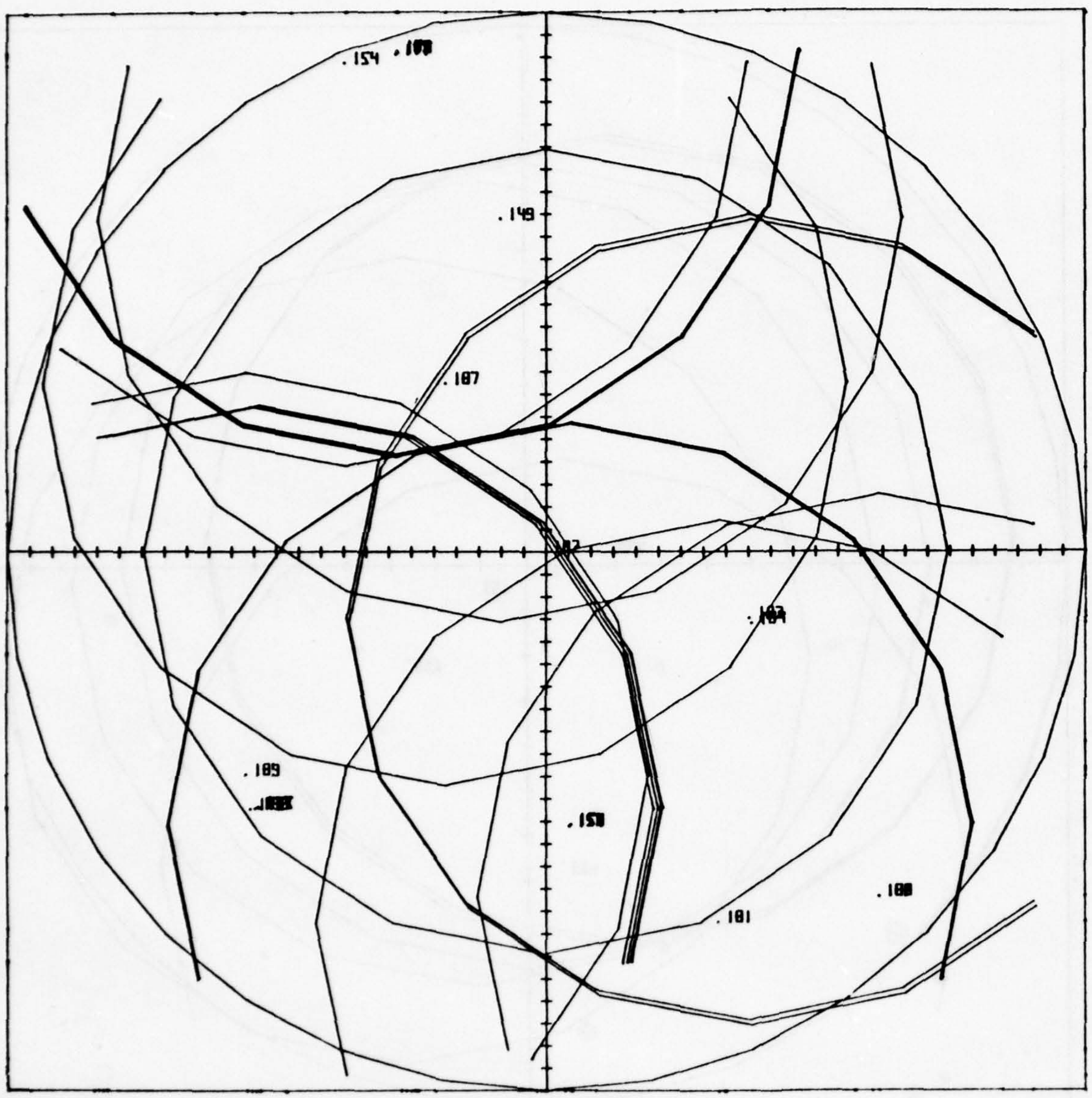
IGHT 1000 GIVES RADIUS 44.72135
ZE OF AREA (RADIUS (NM)) 60

LE # 658 USED AS NOMINAL SITE

RADAR # 654 WITHIN 33.1929741
RADAR # 656 WITHIN 9.543133611
RADAR # 657 WITHIN 16.90148124
RADAR # 658 WITHIN 0 NM
RADAR # 659 WITHIN 5.921307362
RADAR # 663 WITHIN 9.543133611
RADAR # 664 WITHIN 10.0492767
*** ***** ***** ***** *****

O R L

ORLANDO, FLORIDA



IGHT 4000   GIVES RADIUS 89.4427191
IZE OF AREA (RADIUS (NM)) 120

ILE # 182 USED AS NOMINAL SITE

RADAR #	149	WITHIN	74.48408773	NM
RADAR #	150	WITHIN	60.95008936	NM
RADAR #	151	WITHIN	60.95008936	NM
RADAR #	152	WITHIN	61.25187803	NM
RADAR #	154	WITHIN	117.3105047	NM
RADAR #	169	WITHIN	116.0217033	NM
RADAR #	170	WITHIN	115.6252334	NM
RADAR #	171	WITHIN	115.4159927	NM
RADAR #	175	WITHIN	85.30509082	NM
RADAR #	176	WITHIN	86.97784449	NM
RADAR #	177	WITHIN	85.40301842	NM
RADAR #	180	WITHIN	106.[illegible]212	NM
RADAR #	181	WITHIN	90.68457476	NM
RADAR #	182	WITHIN	0 NM	
RADAR #	183	WITHIN	47.59207745	NM
RADAR #	184	WITHIN	48.40053524	NM
RADAR #	187	WITHIN	43.[illegible]216	NM
RADAR #	188	WITHIN	86.1[illegible]340	NM
RADAR #	189	WITHIN	[illegible]	NM

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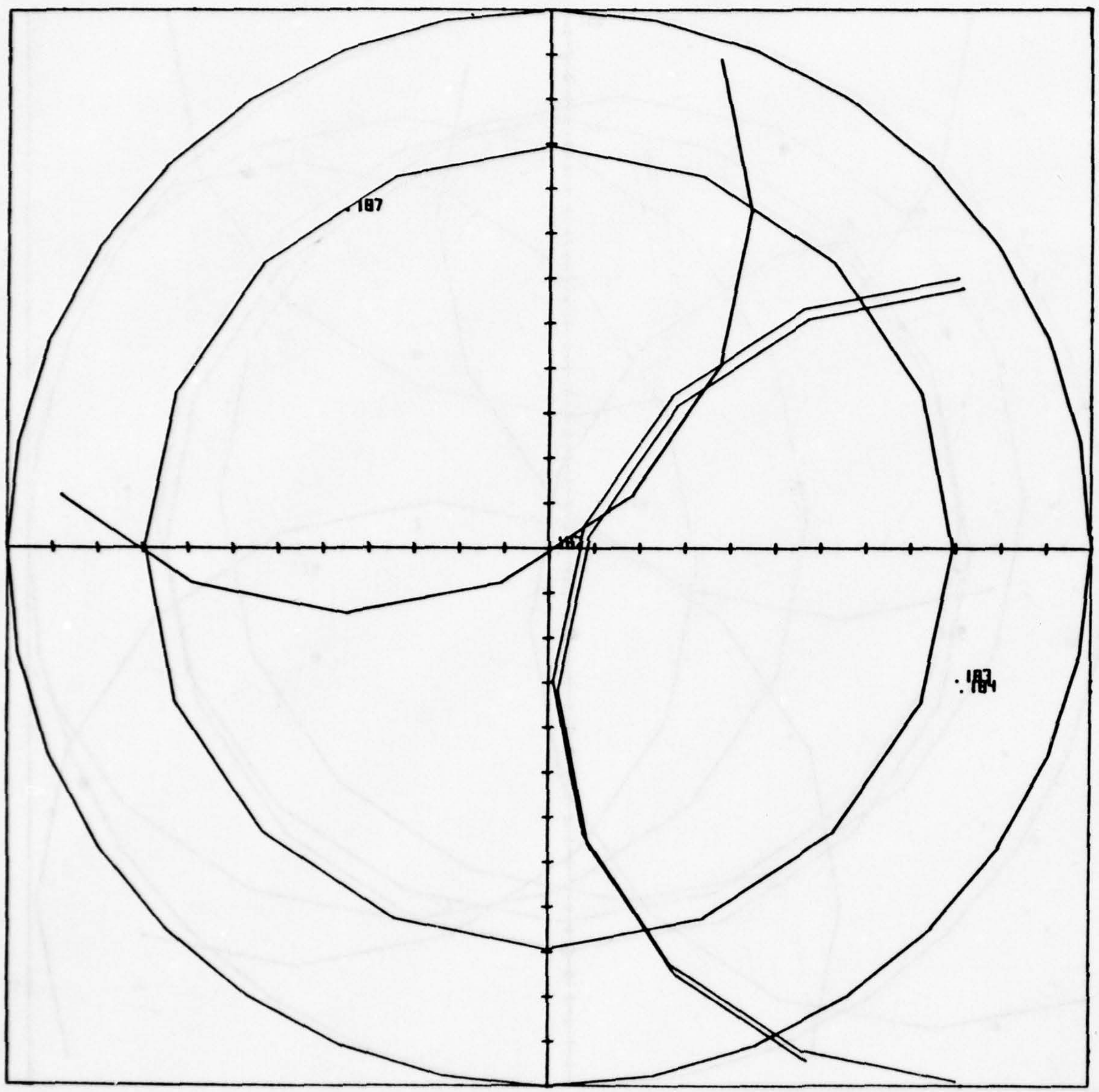
O R L

ORLANDO, FLORIDA

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  ...UNT 1000    GIVES RADIUS 44.72135
  ...L OF AREA (RADIUS (NM)) 60

... IL # 182  USED AS NOMINAL SITE

  RADAR # 182  WITHIN 0     NM
  RADAR # 183  WITHIN 47.59707745
  RADAR # 184  WITHIN 48.48090524
  RADAR # 187  WITHIN 43.62839216
  ***  *****  *****  *****  *****
```
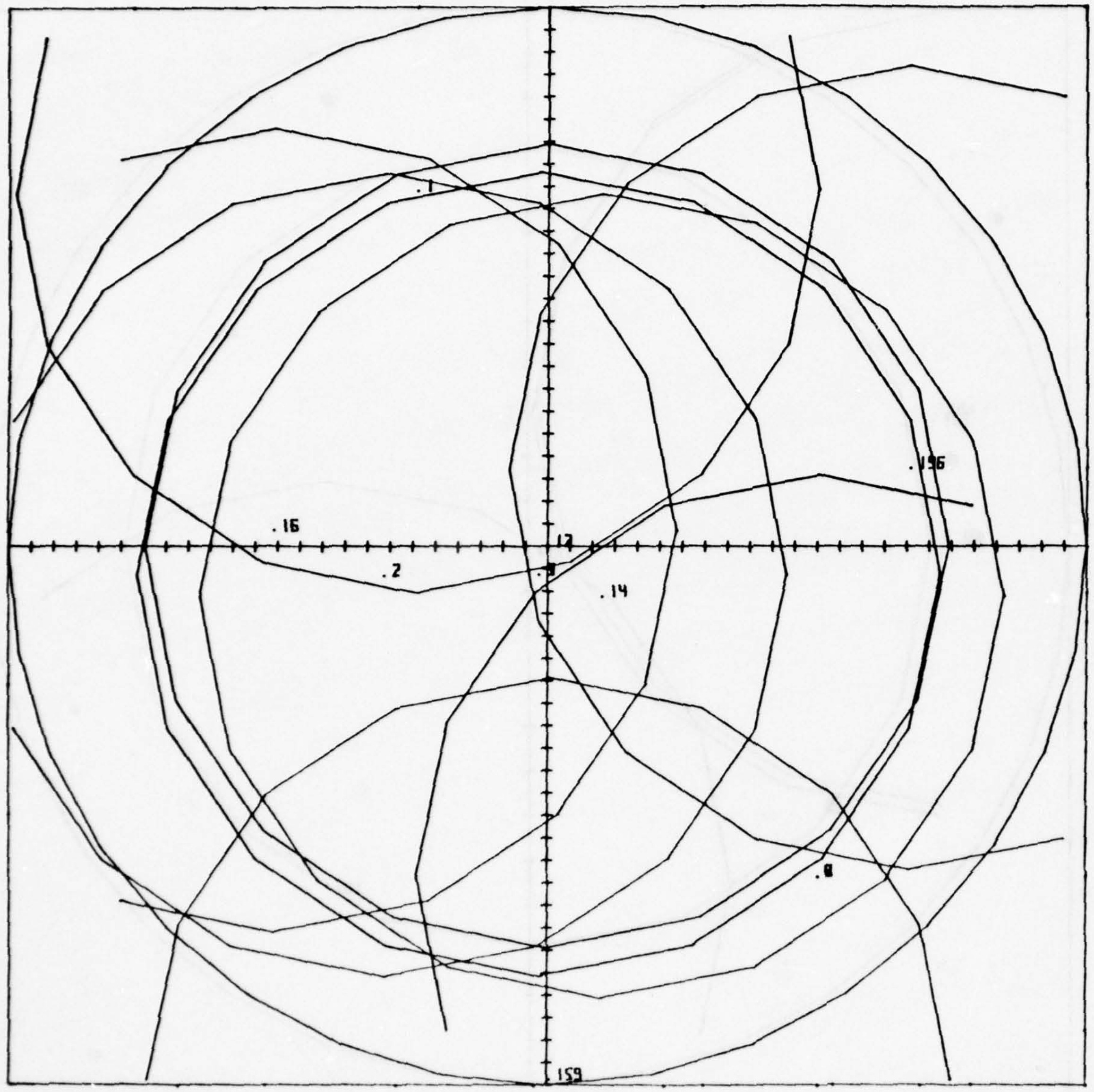

O Z A

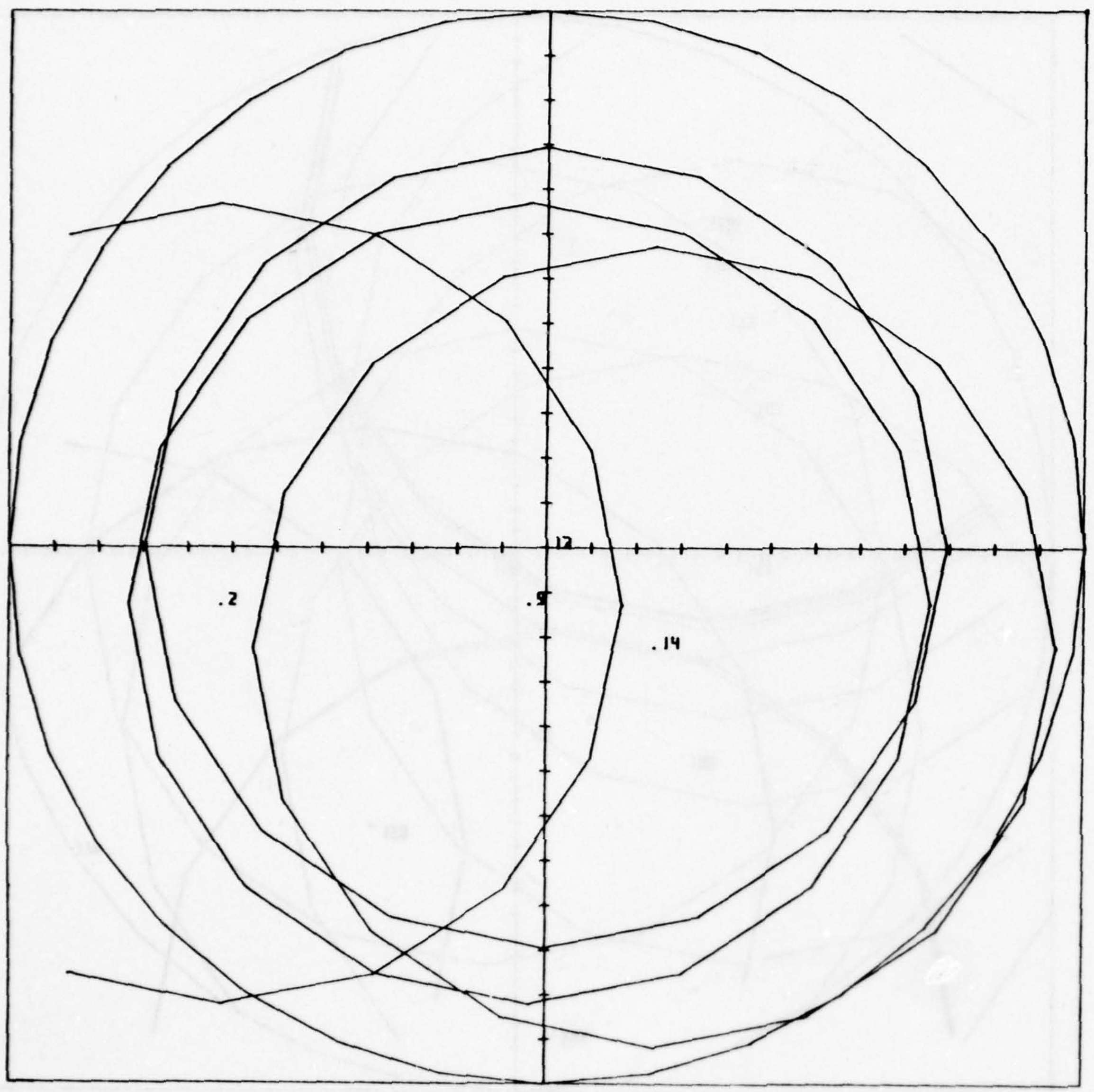
FT. RUCKER, ALABAMA




```
IGHT 4000    GIVES RADIUS 89.4427[illegible]
ZE OF AREA (RADIUS (NM)) 120

TE # 13   USED AS NOMINAL SITE

RADAR # 1    WITHIN 84.[illegible]
RADAR # 2    WITHIN [illegible].80455709
RADAR # 4    WITHIN 6.540811895
RADAR # 5    WITHIN 6.540811895
RADAR # 6    WITHIN 95.1[illegible]
RADAR # 7    WITHIN 95.16085957
RADAR # 8    WITHIN 95.1608595[illegible]
RADAR # 12   WITHIN 0    NM
RADAR # 13   WITHIN 0    NM
RADAR # 14   WITHIN 16.4[illegible]500449
RADAR # 16   WITHIN 60.8[illegible]
RADAR # 159  WITHIN 118.[illegible]647304
RADAR # 196  WITHIN [illegible].6647503
```

O Z A

FT. RUCKER, ALABAMA

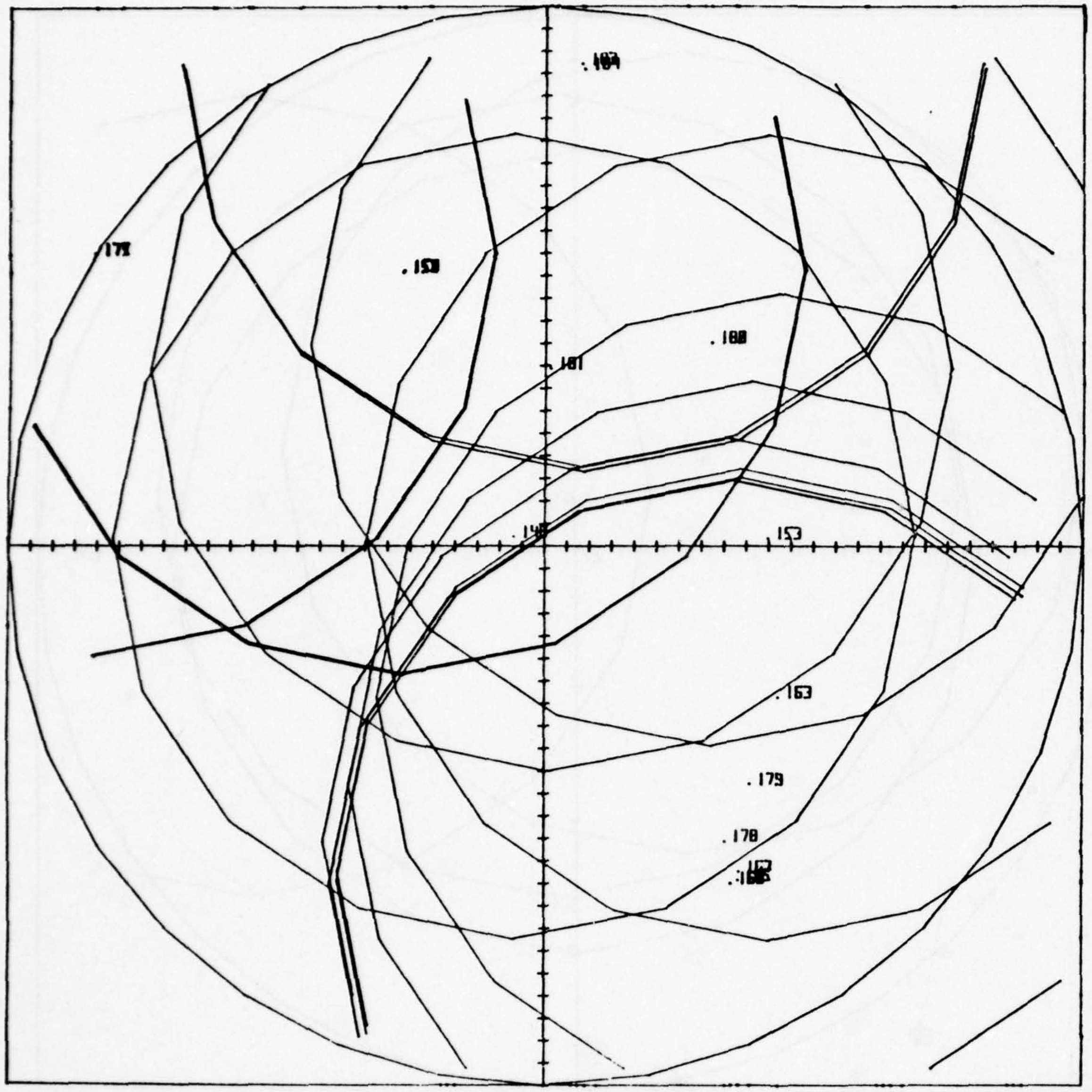


IGHT 1000 GIVES RADIUS 44.721359
ZE OF AREA RADIUS (NM) 60

TE # 13 USED AS NOMINAL SITE

RADAR # 2 WITHIN 36.80455709 NM
RADAR # 4 WITHIN 6.540811895 NM
RADAR # 5 WITHIN 6.540811895 NM
RADAR # 12 WITHIN 0 NM
RADAR # 13 WITHIN 0 NM
RADAR # 14 WITHIN 16.47500449 NM
*** ***** ***** ***** *****

P B I
WEST PALM BEACH, FLA

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GHT 4000     GIVES RADIUS 89.442
E OF AREA  RADIUS (NM) > 120

LE NAME-PBIUSED AS NOMINAL SITE

RADAR # 148  WITHIN 7.167810039   NM
RADAR # 150  WITHIN 68.71679290   NM
RADAR # 151  WITHIN 68.71679290   NM
RADAR # 152  WITHIN 68.56204263   NM
RADAR # 153  WITHIN 49.85007577   NM
RADAR # 163  WITHIN 62.04137950   NM
RADAR # 164  WITHIN 85.75040763   NM
RADAR # 165  WITHIN 85.98891743   NM
RADAR # 166  WITHIN 85.75040763   NM
RADAR # 167  WITHIN 84.43151512   NM
RADAR # 175  WITHIN 113.5997615   NM
RADAR # 177  WITHIN 119.9078894   NM
RADAR # 178  WITHIN 76.93936015   NM
RADAR # 179  WITHIN 70.08933580   NM
RADAR # 180  WITHIN 58.41869737
RADAR # 181  WITHIN 39.40222904
RADAR # 183  WITHIN 107.3711486
RADAR # 184  WITHIN 106.288334
..  *****  *****  *****  *****
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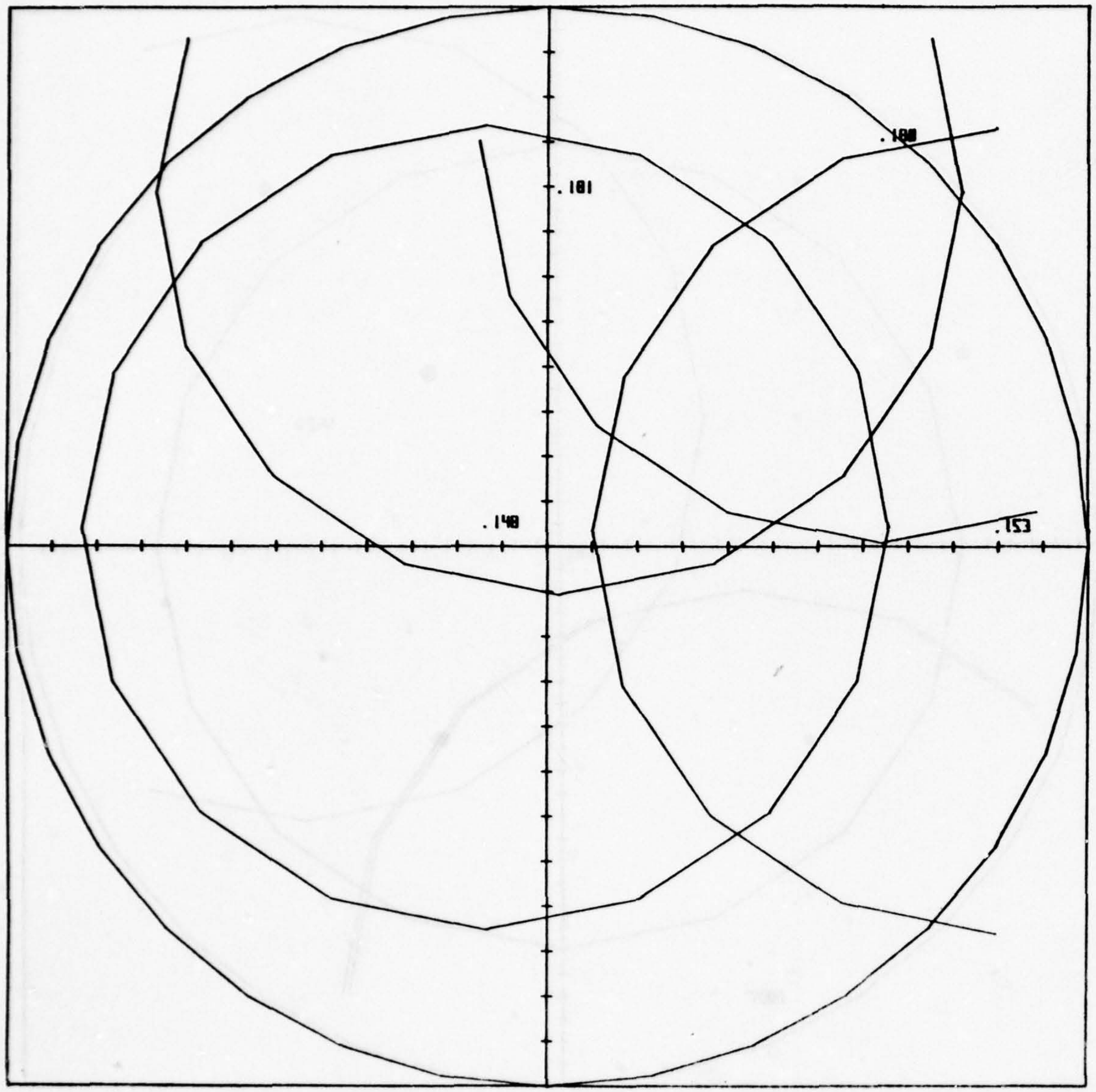
P B I

WEST PALM BEACH, FLA



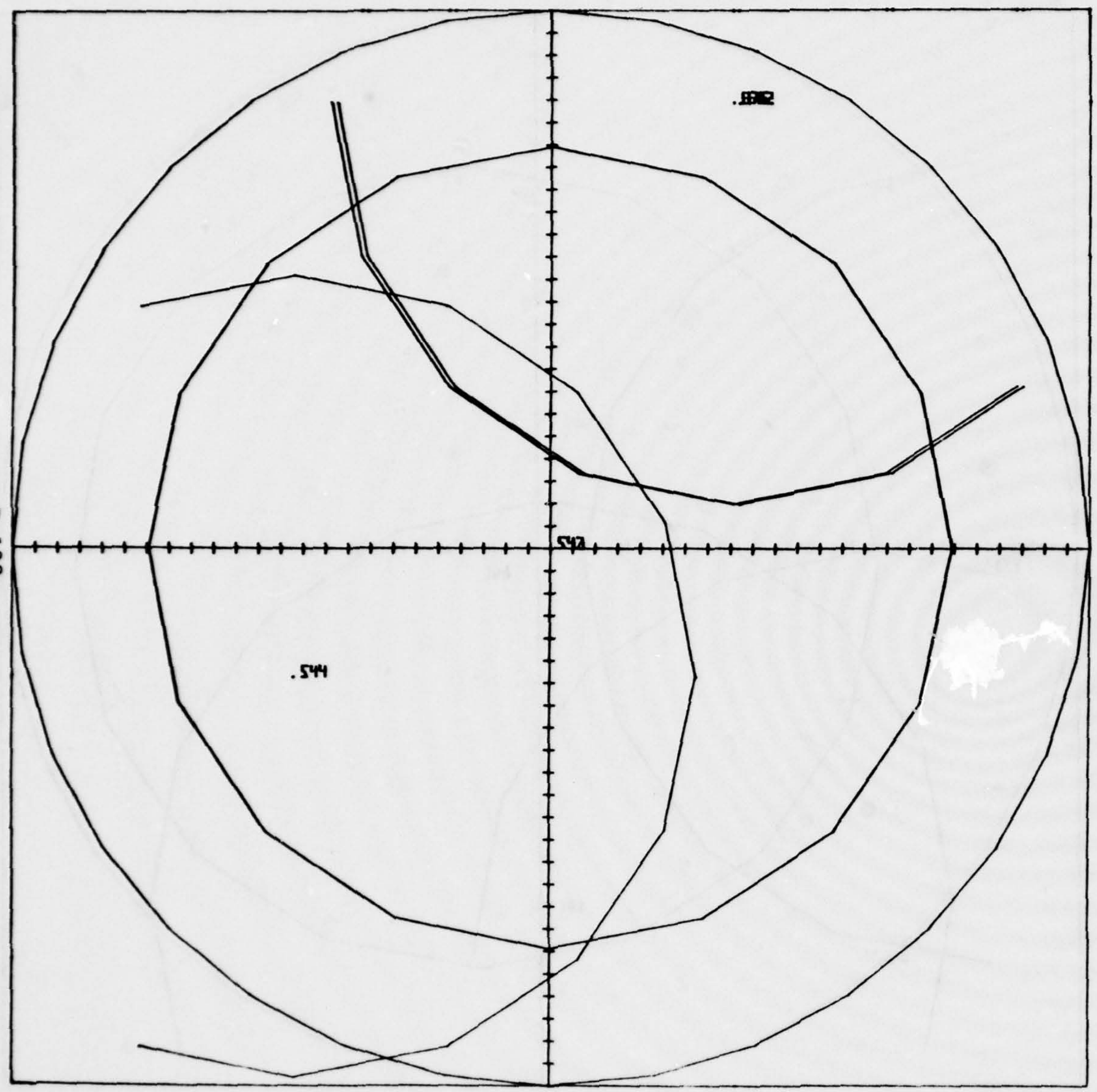
[illegible] GIVES RADIUS 44.721359[illegible]
[illegible] RADIUS (NM) [illegible] 60

[illegible] 113 USED AS NOMINAL

RADAR # 148 WITHIN 7.16781003[illegible] N
RADAR # 153 WITHIN 45.85[illegible] N
RADAR # 180 WITHIN 58.418[illegible] N
RADAR # 181 WITHIN 39.4022[illegible] N

PDX

PORTLAND, OREGON



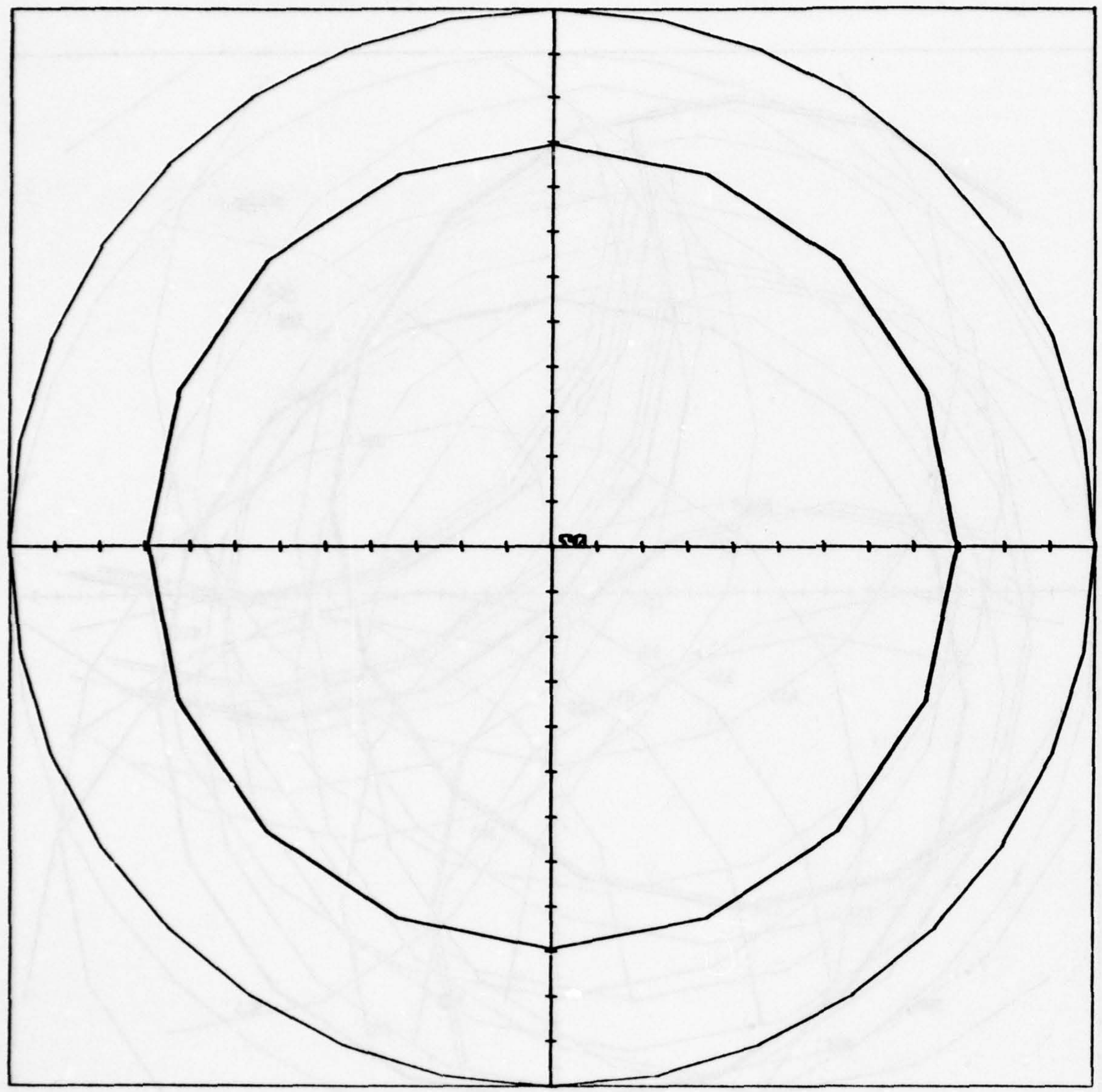
IGHT 4000   GIVES RADIUS 89.4427191
ZE OF AREA RADIUS (NM) 120

E # 542 USED AS NOMINAL SITE

RADAR # 542 WITHIN 0   NM
RADAR # 543 WITHIN 0.170106368   NM
RADAR # 544 WITHIN 63.74008910   NM
RADAR # 676 WITHIN 107.3135384   NM
RADAR # 682 WITHIN 107.769738   NM
*** ***** ***** ***** *****

PDX

PORTLAND, OREGON



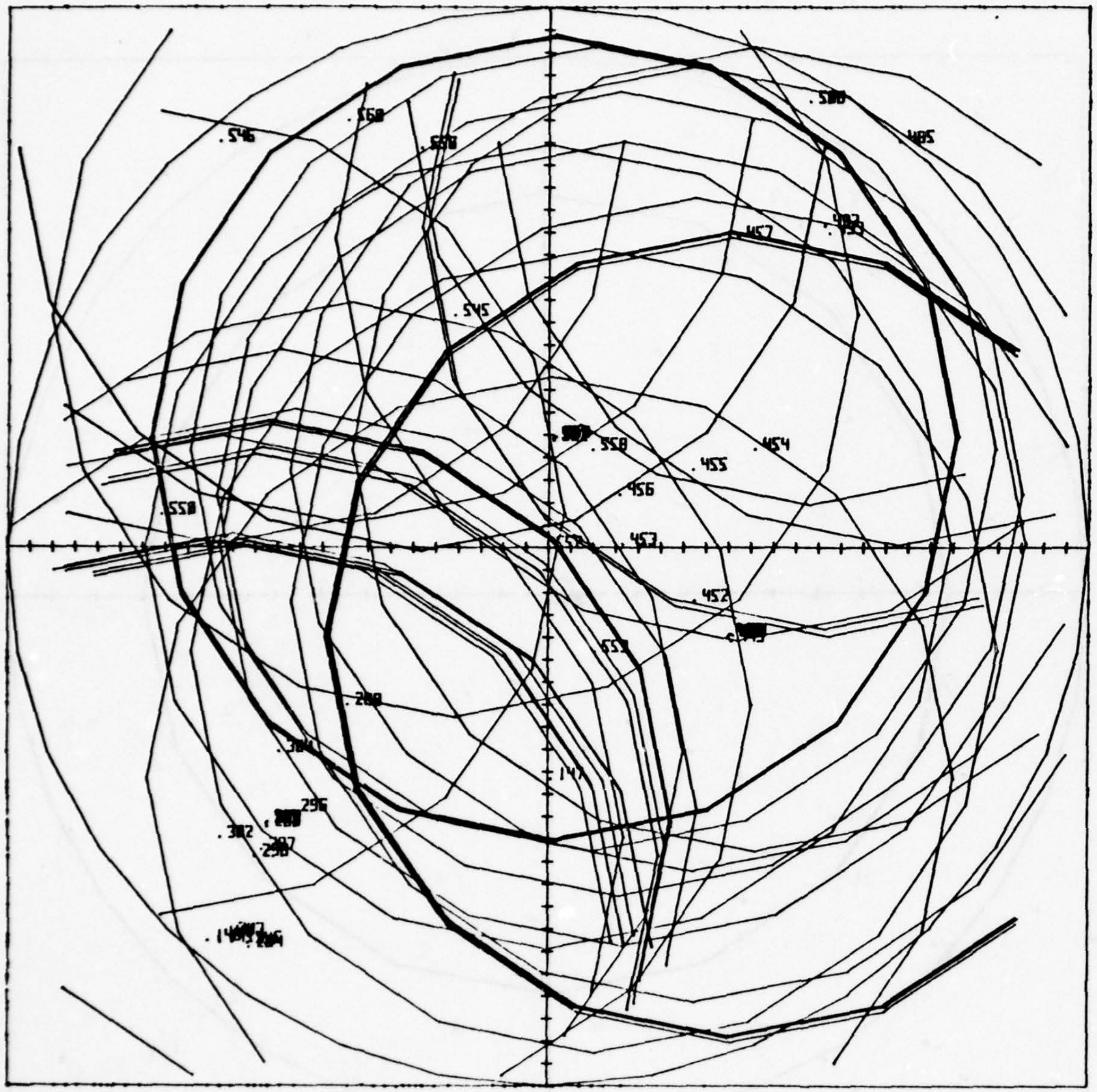
IGHT 1000   GIVES RADIUS 44.721 5
E OF AREA RADIUS (NM) 60

TE # 542 USED AS NOMINAL SITE

RANGE # 542 WITHIN 0 NM
RANGE # 543 WITHIN 0.17010...68
*** ***** ***** ***** *****

P H L

PHILADELPHIA, PENN.

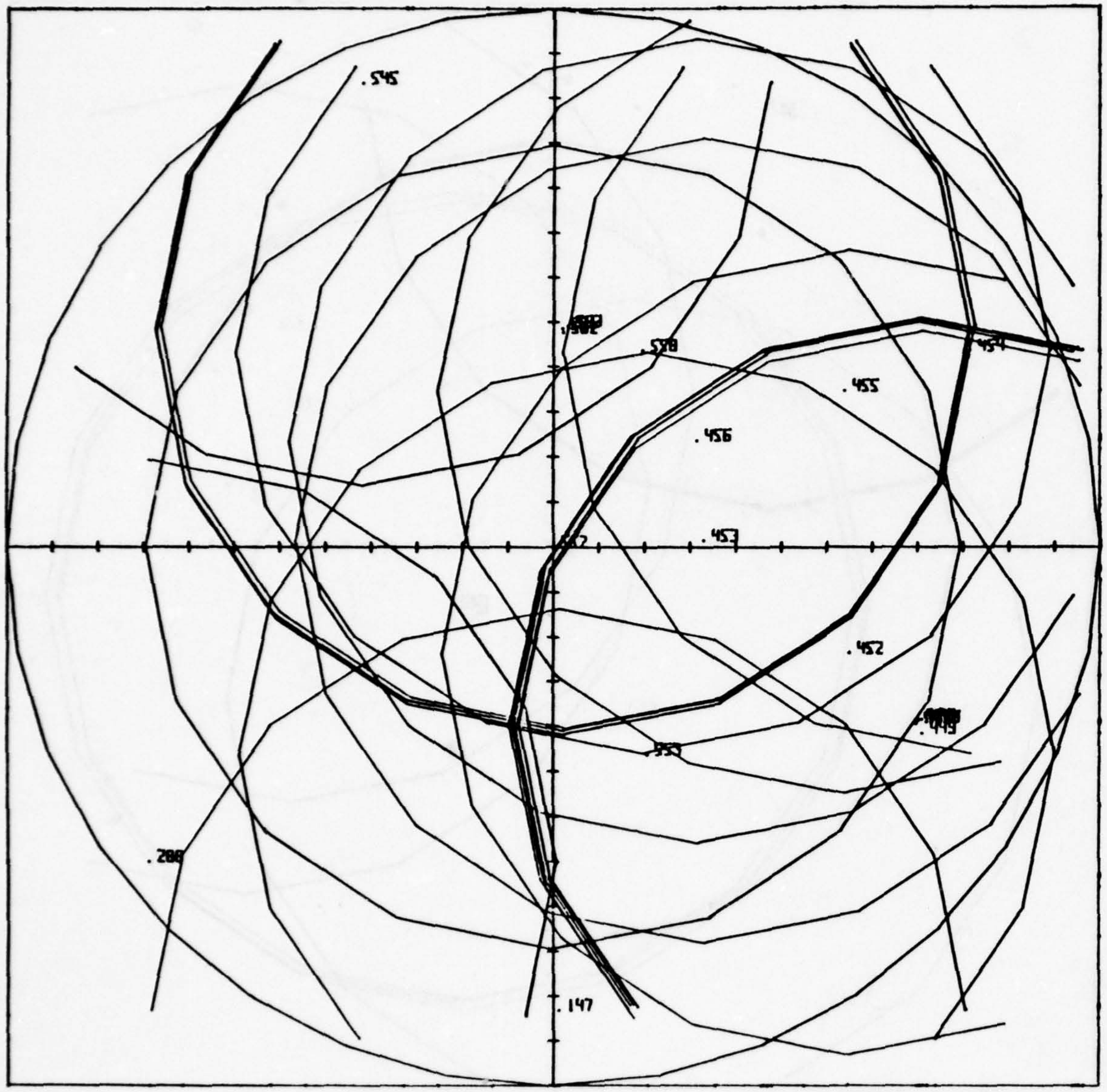


HEIGHT 4000 GIVES RADIUS 89.44271910
SIZE OF AREA RADIUS (NM) 120

FILE # 552 USED AS NOMINAL SITE

RADAR	#	144	WITHIN	113.404[illegible]	I
RADAR	#	145	WITHIN	114.13[illegible]	I
RADAR	#	146	WITHIN	115.6[illegible]115	I
RADAR	#	147	WITHIN	51.5[illegible]051	I
RADAR	#	288	WITHIN	56.52611791	I
RADAR	#	289	WITHIN	87.4[illegible]	I
RADAR	#	290	WITHIN	87.4[illegible]	I
RADAR	#	291	WITHIN	87.4950[illegible]	N
RADAR	#	292	WITHIN	87.0621[illegible]	N
RADAR	#	293	WITHIN	87.4950[illegible]	N
RADAR	#	294	WITHIN	110.[illegible]472	N
RADAR	#	295	WITHIN	110.4[illegible]150	N
RADAR	#	296	WITHIN	81.372[illegible]	N
RADAR	#	297	WITHIN	92.48[illegible]	N
RADAR	#	298	WITHIN	94.5740[illegible]45	N
RADAR	#	299	WITHIN	94.5740[illegible]45	N
RADAR	#	302	WITHIN	97.[illegible]105	N
RADAR	#	303	WITHIN	111.[illegible]	N
RADAR	#	304	WITHIN	74.[illegible]456	N
RADAR	#	446	WITHIN	45.450[illegible]17	N
RADAR	#	447	WITHIN	44.52[illegible]	N
RADAR	#	448	WITHIN	44.8604[illegible]	N
RADAR	#	449	WITHIN	45.6[illegible]	N
RADAR	#	450	WITHIN	45.450[illegible]17	N
RADAR	#	451	WITHIN	44.[illegible]	N
RADAR	#	452	WITHIN	34.50[illegible]	N
RADAR	#	453	WITHIN	16.5[illegible]	N
RADAR	#	454	WITHIN	50.[illegible]17	N
RADAR	#	455	WITHIN	36.[illegible]	N
RADAR	#	456	WITHIN	19.6[illegible]	N
RADAR	#	457	WITHIN	30.54[illegible]11	N
RADAR	#	485	WITHIN	114.0[illegible]	N
RADAR	#	492	WITHIN	94.01[illegible]	N
RADAR	#	493	WITHIN	[illegible]	N
RADAR	#	500	WITHIN	111.[illegible]	N
RADAR	#	545	WITHIN	55.6[illegible]	N
RADAR	#	546	WITHIN	115.[illegible]	N
RADAR	#	550	WITHIN	36.2[illegible]	M
RADAR	#	552	WITHIN	0 NM	
RADAR	#	553	WITHIN	25.[illegible]	M
RADAR	#	555	WITHIN	93.[illegible]	M
RADAR	#	556	WITHIN	93.[illegible]	M
RADAR	#	557	WITHIN	93.[illegible]	M
RADAR	#	558	WITHIN	23.8[illegible]	M
RADAR	#	560	WITHIN	104.6[illegible]408	M
RADAR	#	561	WITHIN	24.26[illegible]	M
RADAR	#	562	WITHIN	23.831[illegible]	M
RADAR	#	563	WITHIN	24.5581[illegible]	M

***** ***** ***** ***** *****



P H L

PHILADELPHIA, PENN.

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HEIGHT 1000    GIVES RADIUS 44.72135955
 .E OF AREA  RADIUS (NM) 60

SITE # 552  USED AS NOMINAL SITE

 RADAR # 147   WITHIN 51.57893051    NI
 RADAR # 288   WITHIN 56.52611791    NI
 RADAR # 446   WITHIN 45.45028617    N
 RADAR # 447   WITHIN 44.52363988    N
 RADAR # 448   WITHIN 44.86647997    N
 RADAR # 449   WITHIN 45.60886372    N
 RADAR # 450   WITHIN 45.45028617    N
 RADAR # 451   WITHIN 44.62177466    I
 RADAR # 452   WITHIN 34.58760276    I
 RADAR # 453   WITHIN 16.52260198    I
 RADAR # 454   WITHIN 50.71382217    I
 RADAR # 455   WITHIN 36.37830062    I
 RADAR # 456   WITHIN 19.69173398    I
 RADAR # 545   WITHIN 55.61926819    I
 RADAR # 552   WITHIN 0    NM
 RADAR # 553   WITHIN 25.36175769
 RADAR # 558   WITHIN 23.87946826
 RADAR # 561   WITHIN 24.26981632
 RADAR # 562   WITHIN 23.83196142    NI
 RADAR # 563   WITHIN 24.55816260    NI
*****  *****  *****  *****  *****
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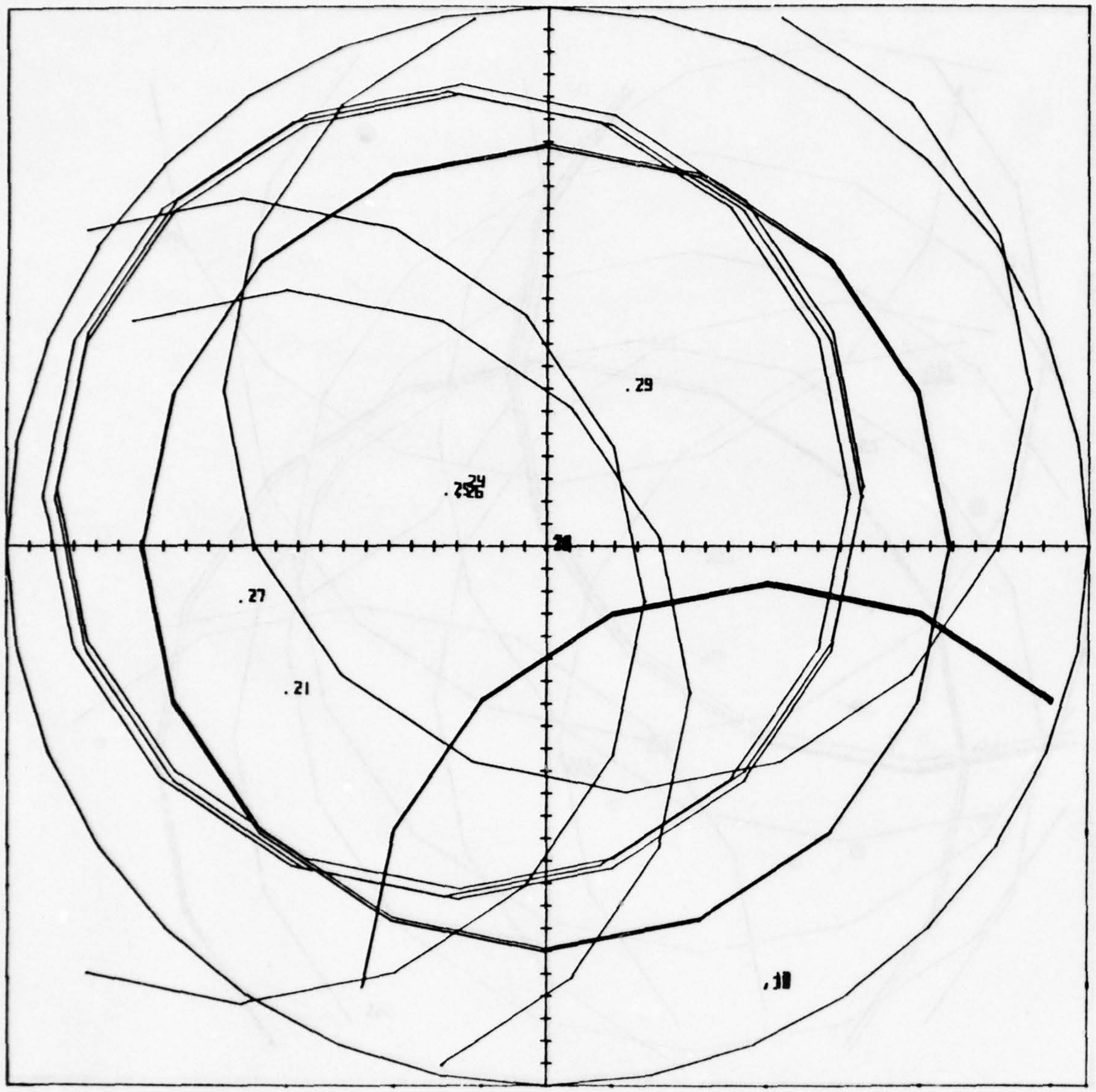

P H X

PHOENIX, ARIZONA

USE 4000 CITY RADIUS 33.44271
CT OF AREA RADIUS NM 120

LOC # 28 USED AS NOMINAL SITE

PROBE # 17	WITHIN	168.7761556	N
PROBE # 18	WITHIN	109.2424358	N
PROBE # 21	WITHIN	[illegible]	N
PROBE # 24	WITHIN	23.34461792	N
PROBE # 25	WITHIN	25.14777894	N
PROBE # 26	WITHIN	[illegible]	N
PROBE # 27	WITHIN	68.9510108	N
PROBE # 28	WITHIN	0 NM	
PROBE # 29	WITHIN	38.97524855	N
PROBE # 30	WITHIN	0.76921 3007	N
PROBE # 31	WITHIN	0.76921 3007	N
PROBE # 32	WITHIN	109.52112 NM	

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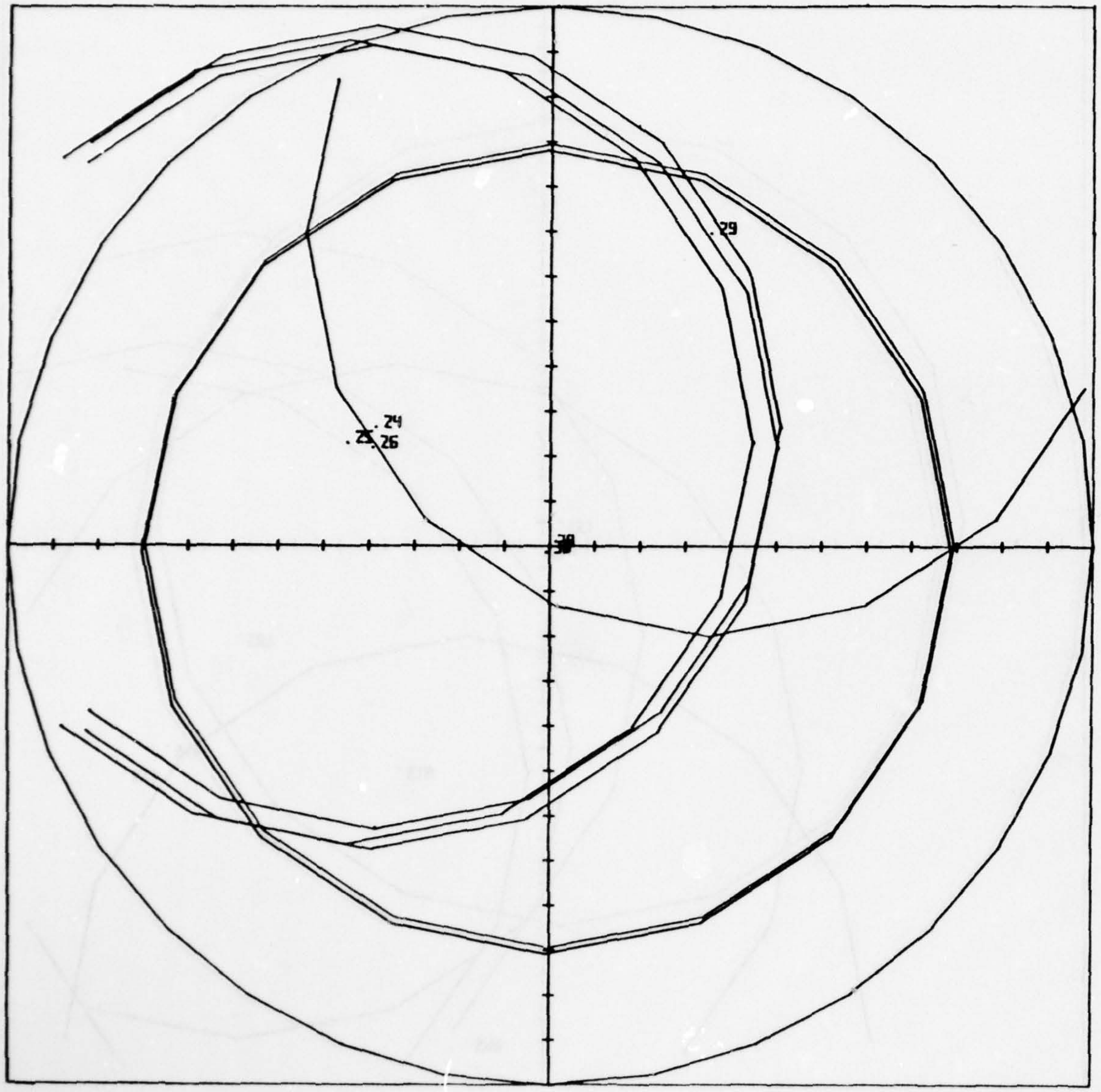
P H X

PHOENIX, ARIZONA

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  IGHT 1000      GIVES RADIUS 44.72135
  ZE OF AREA  RADIUS (NM) 60

  ILE # 28    USED AS NOMINAL SITE

   RADAR # 24    WITHIN 23.34461792
   RADAR # 25    WITHIN 25.14777894
   RADAR # 26    WITHIN 22.46378553
   RADAR # 28    WITHIN 0      NM
   RADAR # 29    WITHIN 38.97524055
   RADAR # 30    WITHIN 0.769213007
   RADAR # 31    WITHIN 0.769213007
   **   *****   *****   *****   *****
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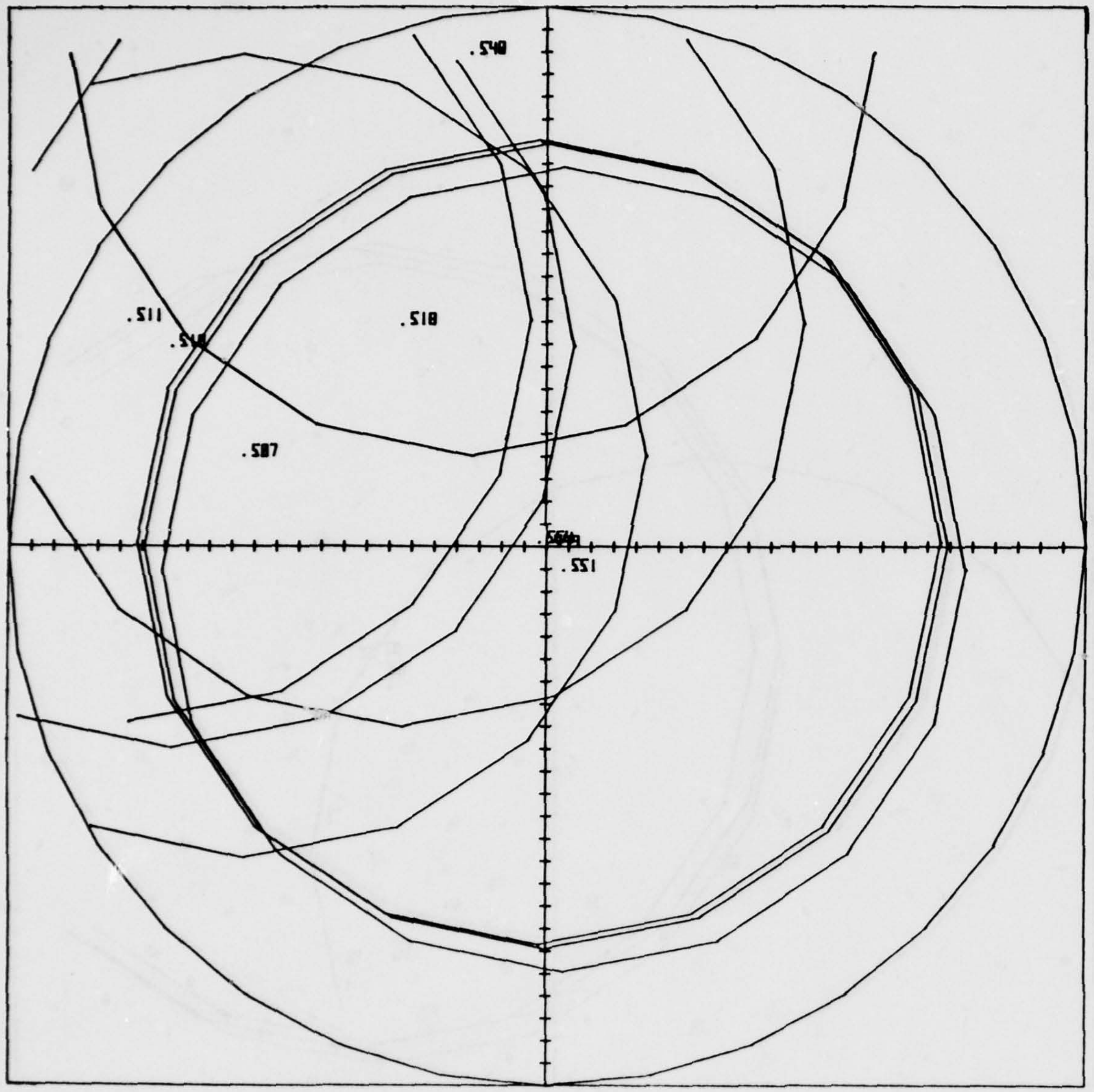
P I T

PITTSBURGH, PENN.

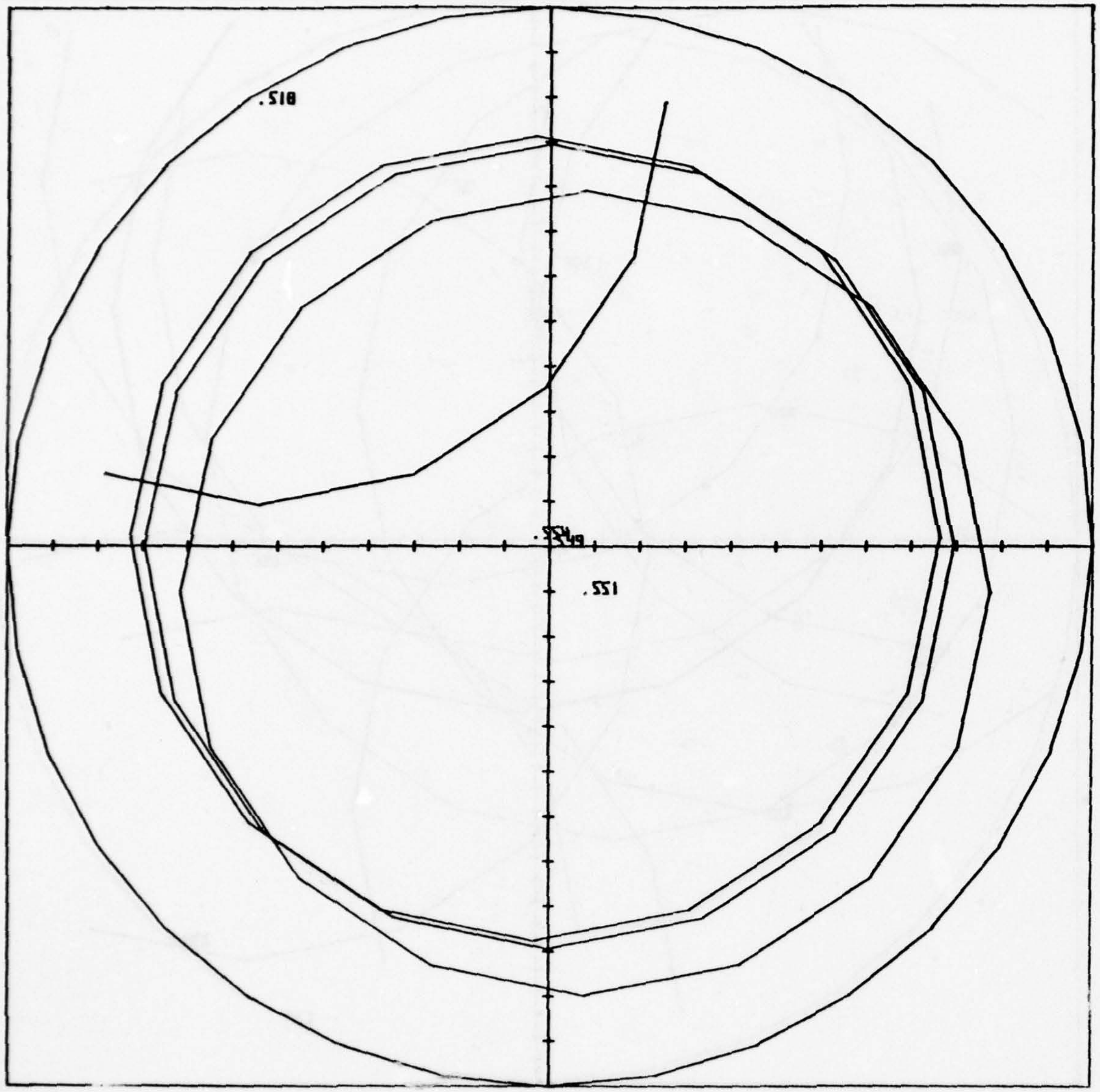


IGHT 4000 GIVES RADIUS 89.4427191
ZE OF AREA RADIUS (NM) 120

LE # 549 USED AS NOMINAL SITE

RADAR #	507	WITHIN	70.09229821	NM
RADAR #	510	WITHIN	94.44622689	NM
RADAR #	511	WITHIN	105.6175424	NM
RADAR #	518	WITHIN	58.79319106	NM
RADAR #	547	WITHIN	110.7980607	NM
RADAR #	548	WITHIN	110.7980607	NM
RADAR #	549	WITHIN	0	NM
RADAR #	551	WITHIN	6.546772744	NM
RADAR #	554	WITHIN	1.807292424	NM

** ***** ***** ***** *****



PIT

PITTSBURGH, PENN.

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IGHT 1000     GIVES RADIUS 44.72135
ZE OF AREA  RADIUS (NM) / 60

.E # 549  USED AS NOMINAL SITE

RADAR # 518  WITHIN 58.79319106
RADAR # 549  WITHIN 0     NM
RADAR # 551  WITHIN 6.546772744
RADAR # 554  WITHIN 1.807292424
***  *****  *****  *****  *****
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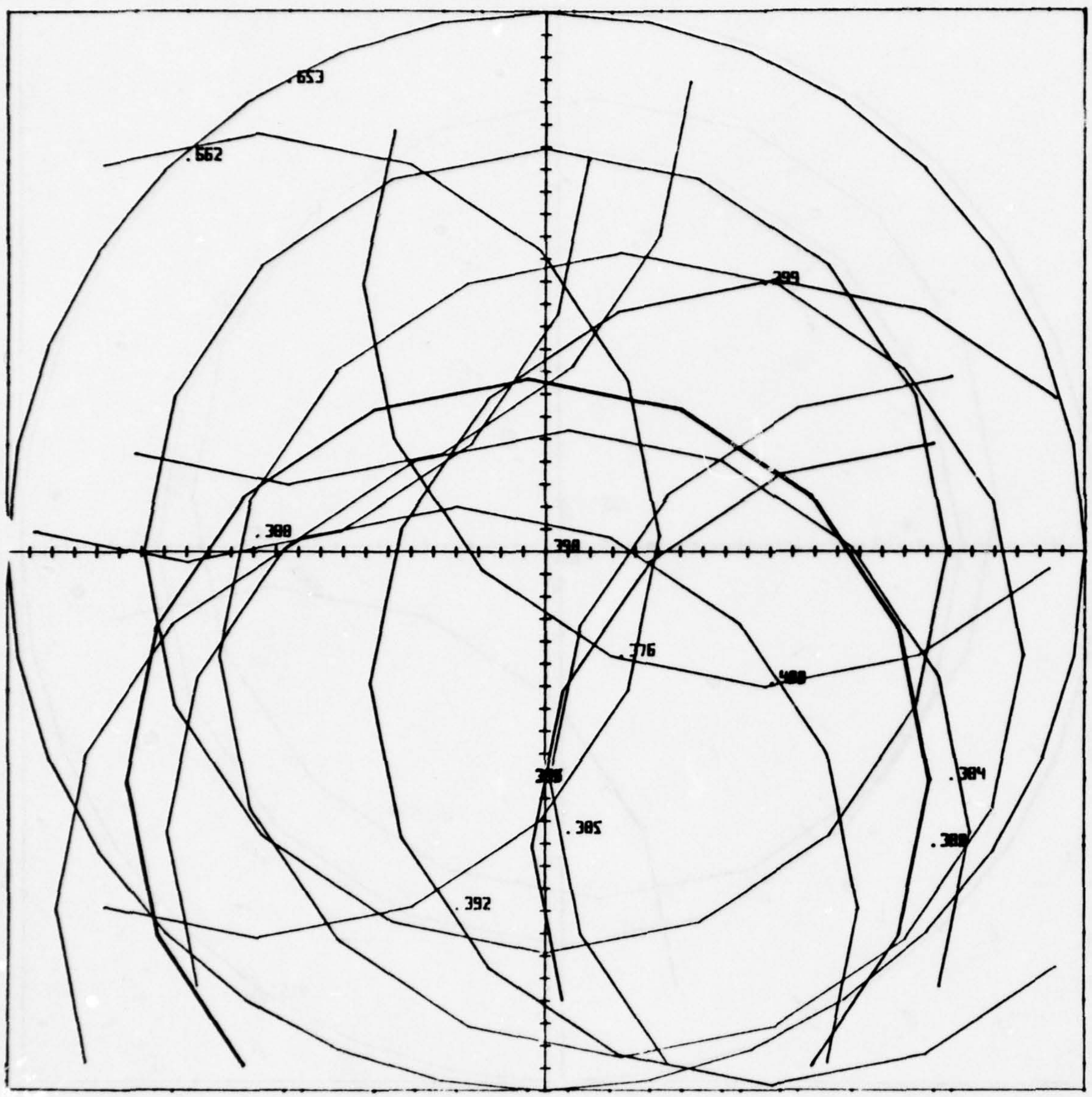
R D U

RALEIGH, N. C.
DURHAM, N. C.

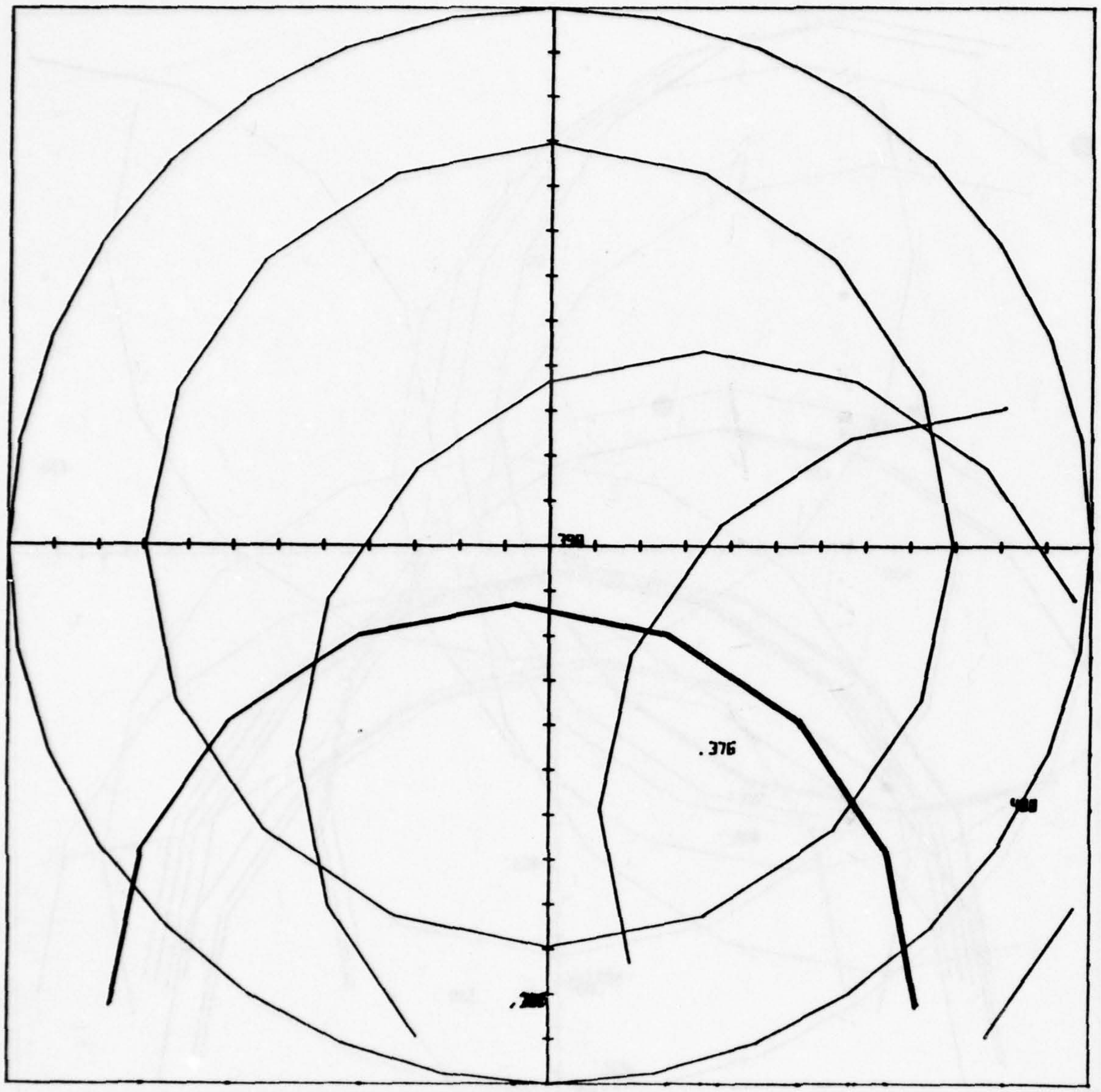


IGHT 4000 GIVES RADIUS 89.4427191[illegible]
ZE OF AREA (RADIUS (NM) 120

LE # 398 USED AS NOMINAL SITE

RADAR	# 376	WITHIN	28.6415[illegible]	!
RADAR	# 384	WITHIN	103.7791617	!
RADAR	# 385	WITHIN	62.81488118	!
RADAR	# 388	WITHIN	64.27[illegible]9707	!
RADAR	# 389	WITHIN	108.600[illegible]	!
RADAR	# 390	WITHIN	108.60032[illegible]	!
RADAR	# 391	WITHIN	108.6003233	!
RADAR	# 392	WITHIN	82.00671030	!
RADAR	# 395	WITHIN	51.51264525	!
RADAR	# 396	WITHIN	51.20876475	
RADAR	# 397	WITHIN	51.51264525	
RADAR	# 398	WITHIN	0 NM	
RADAR	# 399	WITHIN	76.0095466[illegible]	
RADAR	# 400	WITHIN	58.3391[illegible]	
RADAR	# 401	WITHIN	58.3[illegible]	
RADAR	# 653	WITHIN	118.0441[illegible]48	
RADAR	# 662	WITHIN	118.02[illegible]	

**** ***** ***** ***** *****



R D U

RALEIGH, N. C.
DURHAM, N. C.

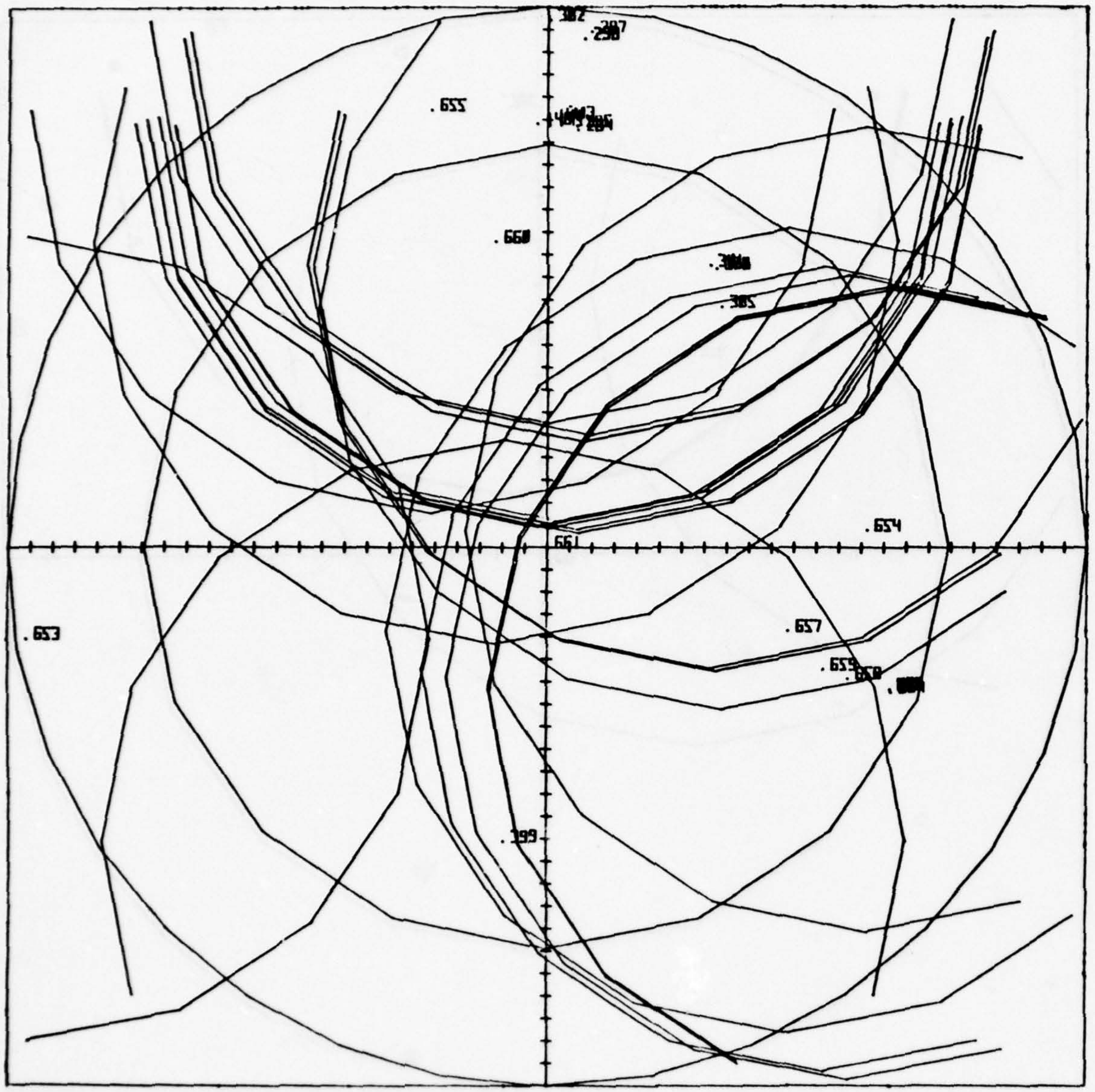
```
IGHT 1000     GIVES RADIUS 44.7213
ZE OF AREA  RADIUS (NM) 60

TE # 398  USED AS NOMINAL SITE

RADAR # 376  WITHIN 28.6415281
RADAR # 395  WITHIN 51.51264525
RADAR # 396  WITHIN 51.20876435
RADAR # 397  WITHIN 51.51264525
RADAR # 398  WITHIN 0    NM
RADAR # 400  WITHIN 58.30919027
RADAR # 401  WITHIN 58.36539266
***  *****  *****  *****  *****
```

R I C

RICHMOND, VA



[illegible] 4000 GIVES RADIUS 89.44271
[illegible] AREA RADIUS (NM) 120

[illegible] # 661 USED AS NOMINAL SITE

RADAR	#	144	WITHIN	94.84[illegible]4567	
RADAR	#	145	WITHIN	[illegible]	
RADAR	#	146	WITHIN	94.00[illegible]	
RADAR	#	294	WITHIN	[illegible]	NM
RADAR	#	295	WITHIN	[illegible]	NM
RADAR	#	297	WITHIN	11[illegible].8[illegible]	NM
RADAR	#	298	WITHIN	113.2451445	NM
RADAR	#	299	WITHIN	113.2451445	NM
RADAR	#	300	WITHIN	72.32684694	NM
RADAR	#	301	WITHIN	72.2[illegible]100[illegible]	NM
RADAR	#	302	WITHIN	117.04[illegible]86	NM
RADAR	#	303	WITHIN	95.411[illegible]39	NM
RADAR	#	305	WITHIN	66.00[illegible]75	NM
RADAR	#	399	WITHIN	67.24788921	NM
RADAR	#	653	WITHIN	117.40[illegible]103	NM
RADAR	#	654	WITHIN	71.291[illegible]57	NM
RADAR	#	655	WITHIN	100.[illegible]	NM
RADAR	#	656	WITHIN	82.64[illegible]1866	NM
RADAR	#	657	WITHIN	57.015[illegible]284	
RADAR	#	658	WITHIN	73.20[illegible]42	
RADAR	#	659	WITHIN	67.30[illegible]442	
RADAR	#	660	WITHIN	68.7671324[illegible]	
RADAR	#	661	WITHIN	0 NM	
RADAR	#	663	WITHIN	82.64[illegible]	
RADAR	#	664	WITHIN	[illegible].21[illegible]71	

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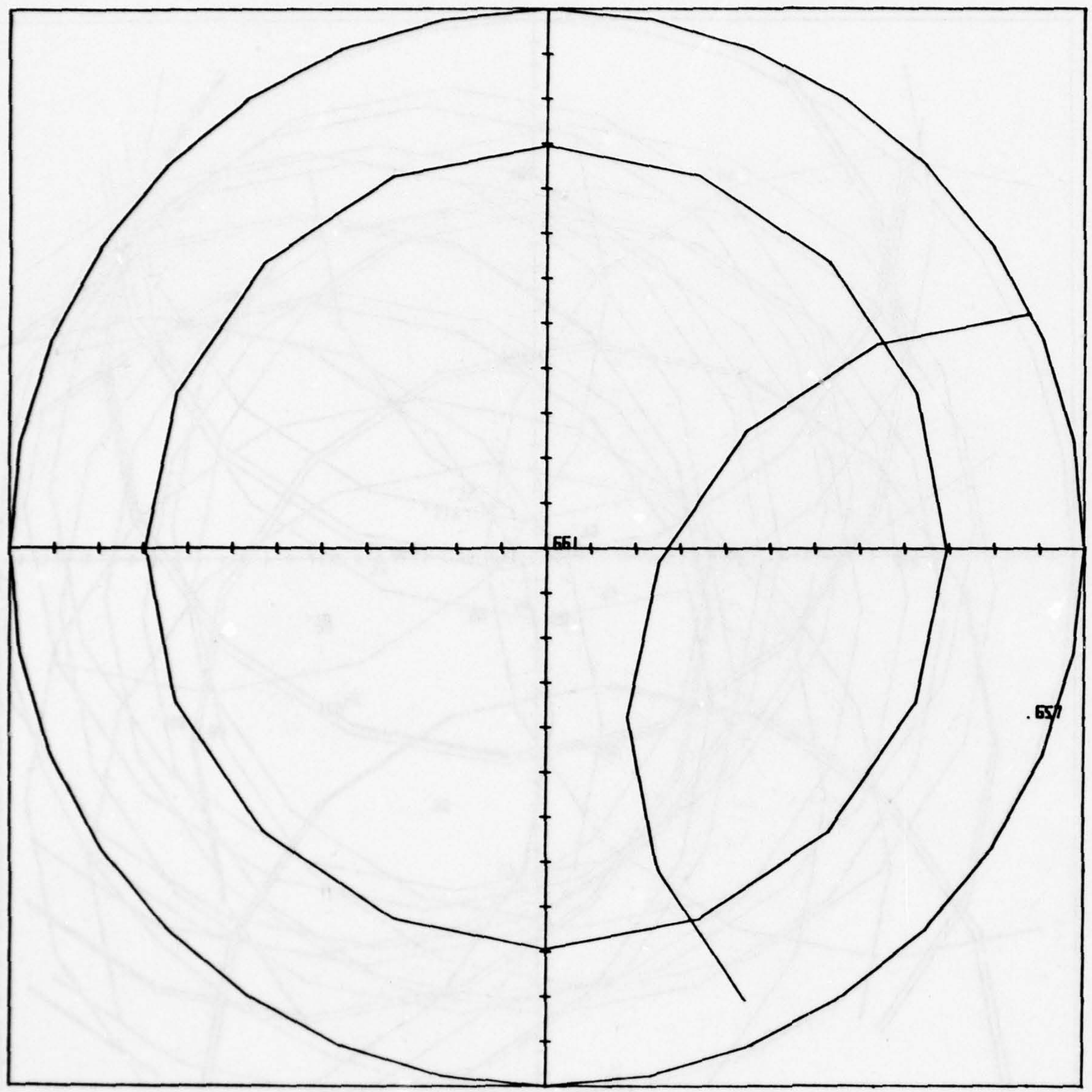
R I C

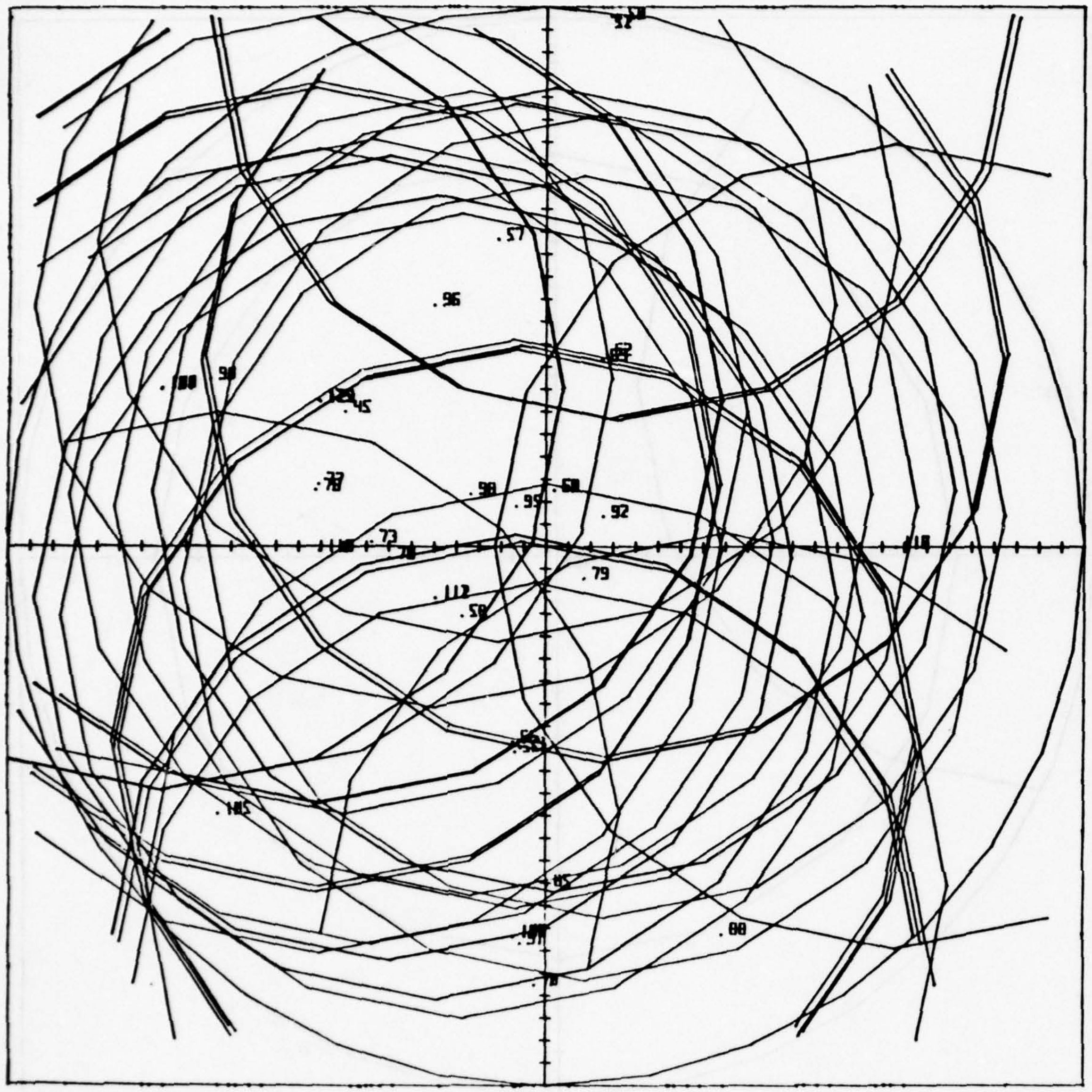
RICHMOND, VA



IGHT 1000 GIVES RADIUS 44.72135
E OF AREA RADIUS (NM) 60

E # 661 USED AS NOMINAL SITE

RADAR # 657 WITHIN 57.01536284 I
RADAR # 661 WITHIN 0 NM
** ***** ***** ***** *****



R I V

RIVERSIDE, CAL

HEIGHT 4000   GIVES RADIUS 89.44271910
SIZE OF AREA RADIUS (NM) 120

FILE NAME RIV USED AS NOMINAL SITE

RADAR # 45	WITHIN	53.72854772	NM
RADAR # 50	WITHIN	118.6964633	NM
RADAR # 51	WITHIN	118.9310881	NM
RADAR # 52	WITHIN	118.9310881	NM
RADAR # 54	WITHIN	45.0498442	NM
RADAR # 55	WITHIN	46.07599019	NM
RADAR # 56	WITHIN	43.98652893	NM
RADAR # 57	WITHIN	69.09313903	NM
RADAR # 58	WITHIN	24.23300510	NM
RADAR # 59	WITHIN	12.68279513	NM
RADAR # 60	WITHIN	12.68279513	NM
RADAR # 62	WITHIN	44.8087677	NM
RADAR # 63	WITHIN	43.36947170	NM
RADAR # 64	WITHIN	43.36947176	NM
RADAR # 70	WITHIN	97.55104959	NM
RADAR # 73	WITHIN	30.74678312	NM
RADAR # 74	WITHIN	34.76549932	NM
RADAR # 75	WITHIN	34.76549932	NM
RADAR # 76	WITHIN	52.65731525	NM
RADAR # 77	WITHIN	52.34523770	NM
RADAR # 79	WITHIN	11.19284455	NM
RADAR # 85	WITHIN	75.49396643	NM
RADAR # 88	WITHIN	94.90313835	NM
RADAR # 90	WITHIN	83.43972775	NM
RADAR # 91	WITHIN	88.49993005	NM
RADAR # 92	WITHIN	14.68804565	NM
RADAR # 95	WITHIN	11.12470303	NM
RADAR # 96	WITHIN	59.21731588	NM
RADAR # 98	WITHIN	20.46199122	NM
RADAR # 100	WITHIN	92.44500617	NM
RADAR # 101	WITHIN	92.6015754	NM
RADAR # 105	WITHIN	94.1211151	NM
RADAR # 106	WITHIN	87.03166672	NM
RADAR # 107	WITHIN	87.03166672	NM
RADAR # 108	WITHIN	87.03166672	NM
RADAR # 110	WITHIN	50.15878105	NM
RADAR # 111	WITHIN	26.59996720	NM
RADAR # 112	WITHIN	26.59996720	NM
RADAR # 116	WITHIN	28.08848475	NM
RADAR # 117	WITHIN	28.08848475	NM
RADAR # 123	WITHIN	59.8351723	NM
RADAR # 124	WITHIN	59.62376582	NM
	WITHIN	[illegible]	NM

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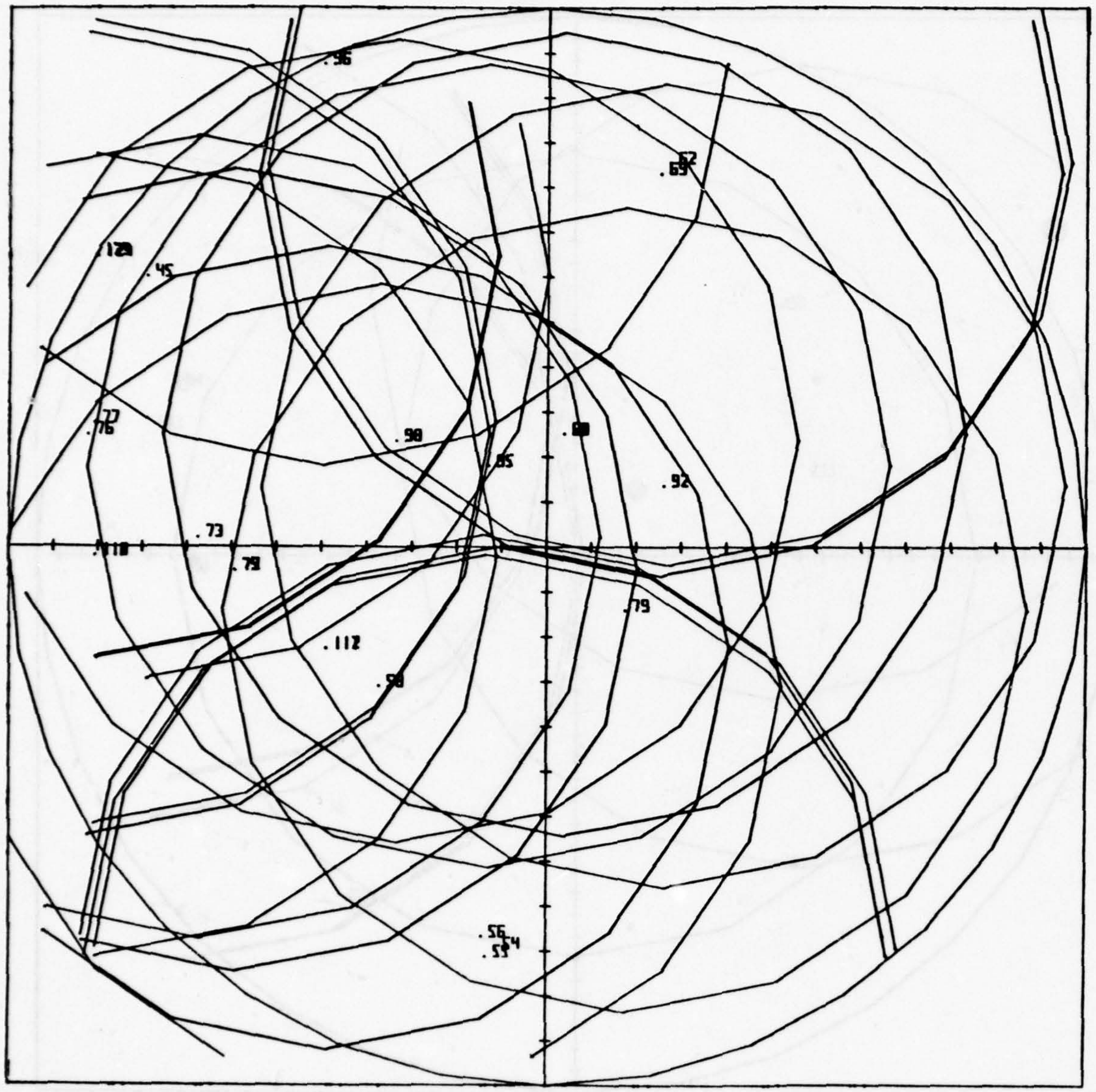
R I V

RIVERSIDE, CAL



I 1000 GIVES RADIUS 44.721359
OF AREA RADIUS (NM) > 60

NAME	RIV	USED AS NOMINAL	
DAR # 45	WITHIN	53.72854772	NI
DAR # 54	WITHIN	45.0498442	NM
DAR # 55	WITHIN	46.0759901?	NM
RADAR # 56	WITHIN	43.98652093	NM
RADAR # 58	WITHIN	24.23300510	NM
RADAR # 59	WITHIN	12.68279513	NM
RADAR # 60	WITHIN	12.68279513	NM
RADAR # 62	WITHIN	44.8087677	NM
RADAR # 63	WITHIN	43.36947170	NM
RADAR # 64	WITHIN	43.36947170	NM
RADAR # 73	WITHIN	38.74678312	NM
RADAR # 74	WITHIN	34.76549932	NM
RADAR # 75	WITHIN	34.76549932	NM
RADAR # 76	WITHIN	52.65731525	NM
RADAR # 77	WITHIN	52.34523770	NM
RADAR # 79	WITHIN	11.19284455	NM
RADAR # 92	WITHIN	14.68804565	NM
RADAR # 95	WITHIN	11.12470303	NM
RADAR # 96	WITHIN	59.21731538	NM
RADAR # 98	WITHIN	20.46199122	NM
RADAR # 110	WITHIN	50.29878185	NM
RADAR # 111	WITHIN	26.95996720	NM
DAR # 112	WITHIN	26.95996720	N
DAR # 123	WITHIN	59.8351723	I
DAR # 124	WITHIN	59.62376582	I

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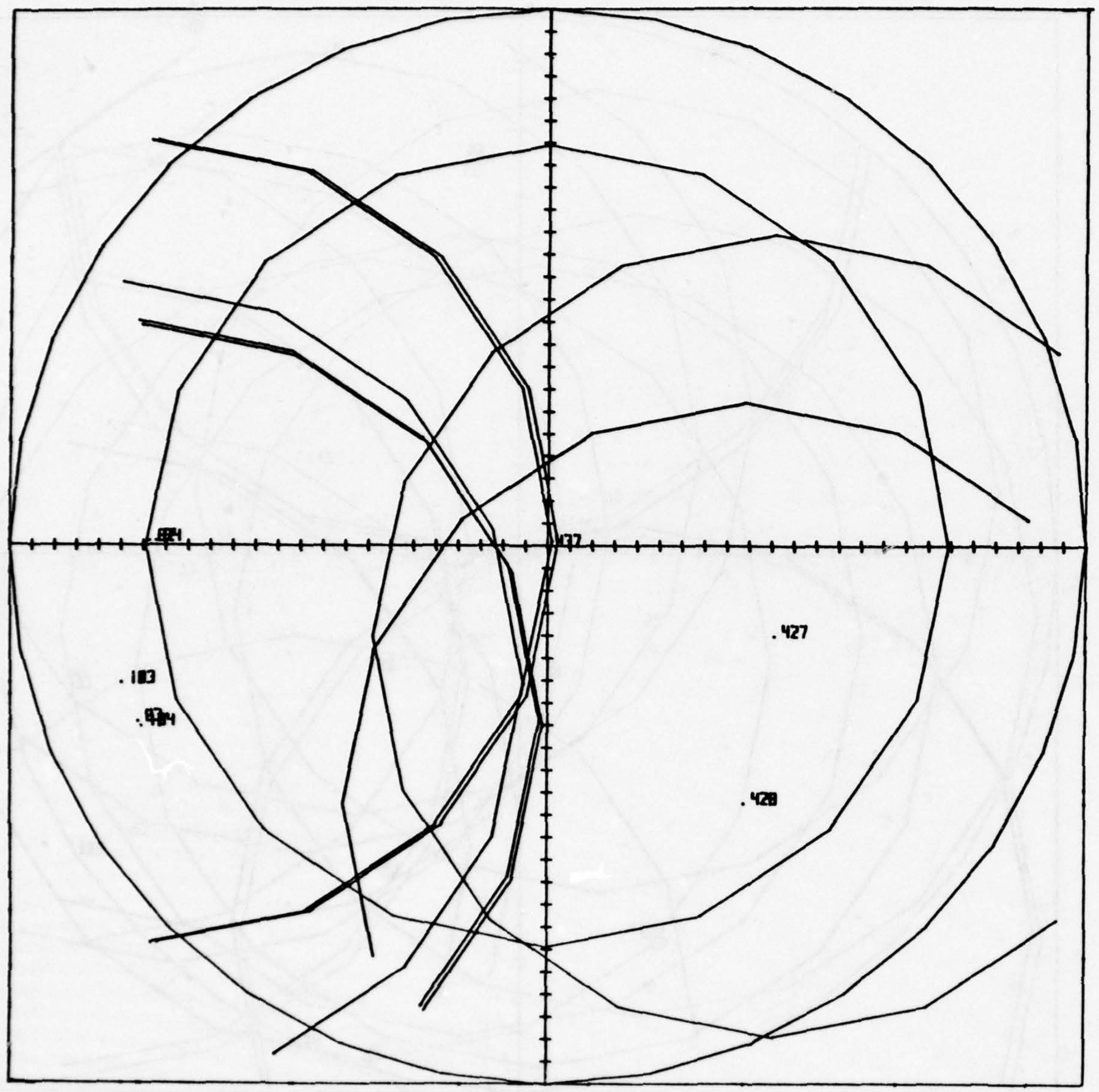
R N O

RENO, NEVADA



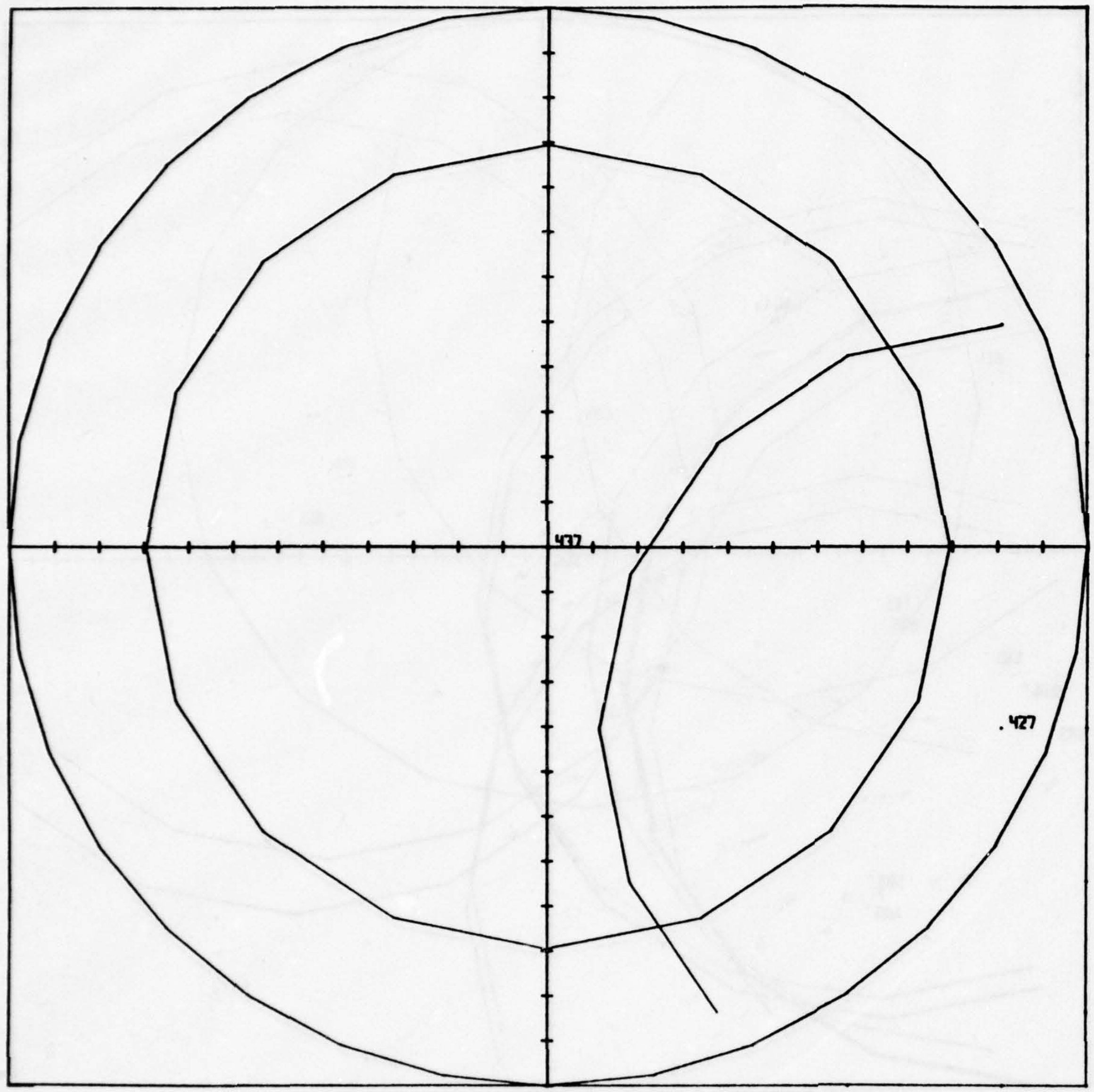
IGHT 4000   GIVES RADIUS 89.44271
ZE OF AREA (RADIUS (NM)) 126

LE # 437 USED AS NOMINAL SITE

RADAR # 44   WITHIN 87.10680104
RADAR # 82   WITHIN 88.4966694
RADAR # 83   WITHIN 99.34417567
RADAR # 103 WITHIN 99.73565773
RADAR # 104 WITHIN 99.05558989
RADAR # 427 WITHIN 54.41557902
RADAR # 428 WITHIN 72.36484225
RADAR # 429 WITHIN 72.36484225
RADAR # 437 WITHIN 0   NM
**** ***** ***** ***** *****

R N O

RENO, NEVADA

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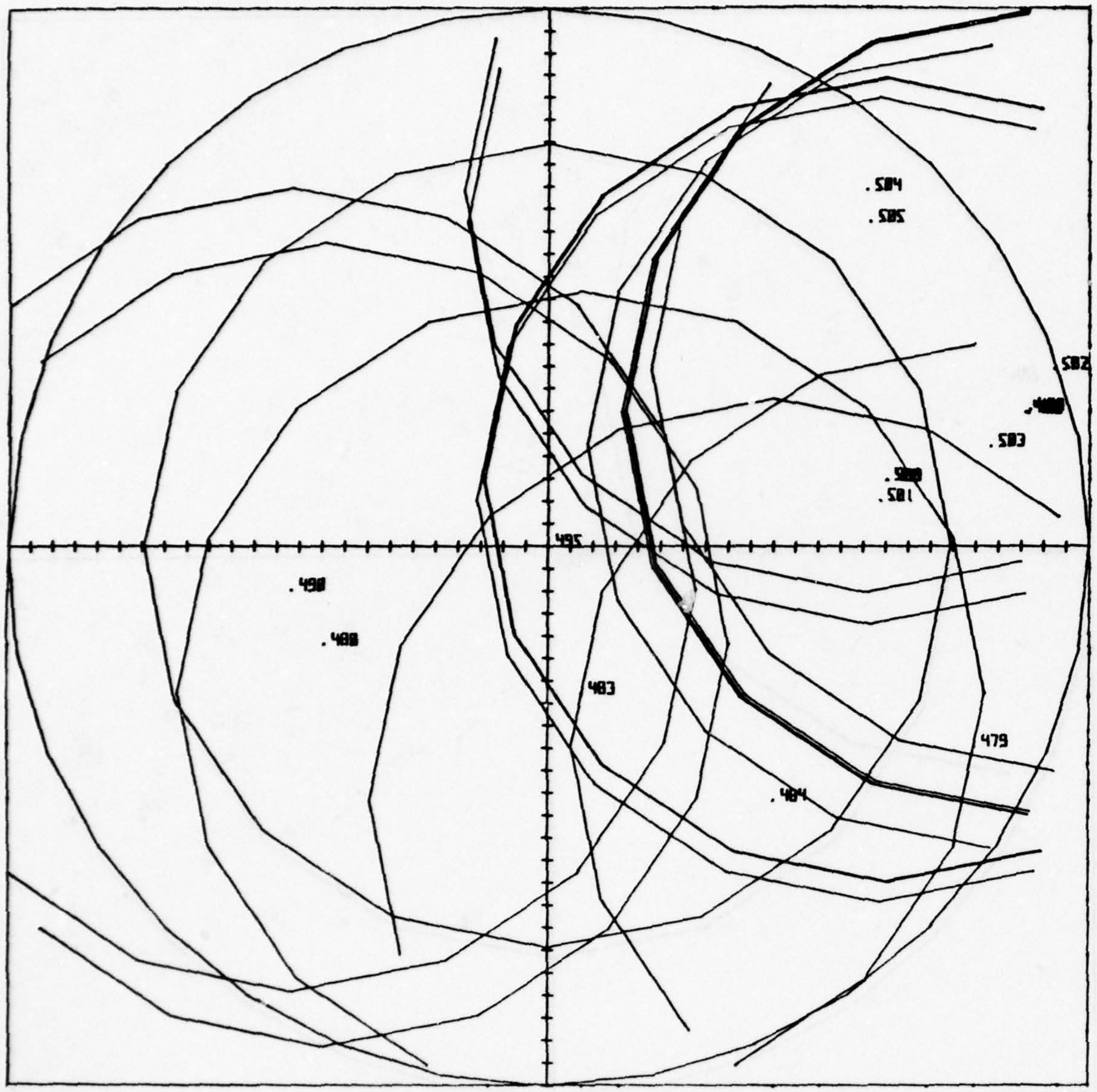
IGHT 1000     GIVES RADIUS 44.7213
ZE OF AREA (RADIUS (NM)> 60

ILE # 437  USED AS NOMINAL SITE

RADAR # 427  WITHIN 54.41557902
RADAR # 437  WITHIN 0     NM
****  *****  *****  *****  *****
```

R O C

ROCHESTER, N. Y.



HEIGHT 4000 GIVES RADIUS 89.4427191
ZE OF AREA (RADIUS (NM)) 1.0

LE # 495 USED AS NOMINAL SITE

RADAR #	479	WITHIN	104.6423904	NM
RADAR #	480	WITHIN	54.15740715	NM
RADAR #	483	WITHIN	33.69228154	NM
RADAR #	484	WITHIN	75.63151192	NM
RADAR #	486	WITHIN	110.5156361	NM
RADAR #	487	WITHIN	110.5156361	NM
RADAR #	488	WITHIN	111.0712677	NM
RADAR #	489	WITHIN	76.79699460	NM
RADAR #	490	WITHIN	57.54716423	NM
RADAR #	495	WITHIN	0 NM	
RADAR #	496	WITHIN	109.8791315	NM
RADAR #	500	WITHIN	76.51755441	NM
RADAR #	501	WITHIN	74.38450164	NM
RADAR #	502	WITHIN	118.9355373	NM
RADAR #	503	WITHIN	100.5958702	NM
RADAR #	504	WITHIN	106.0762034	NM
RADAR #	505	WITHIN	101.4599231	NM

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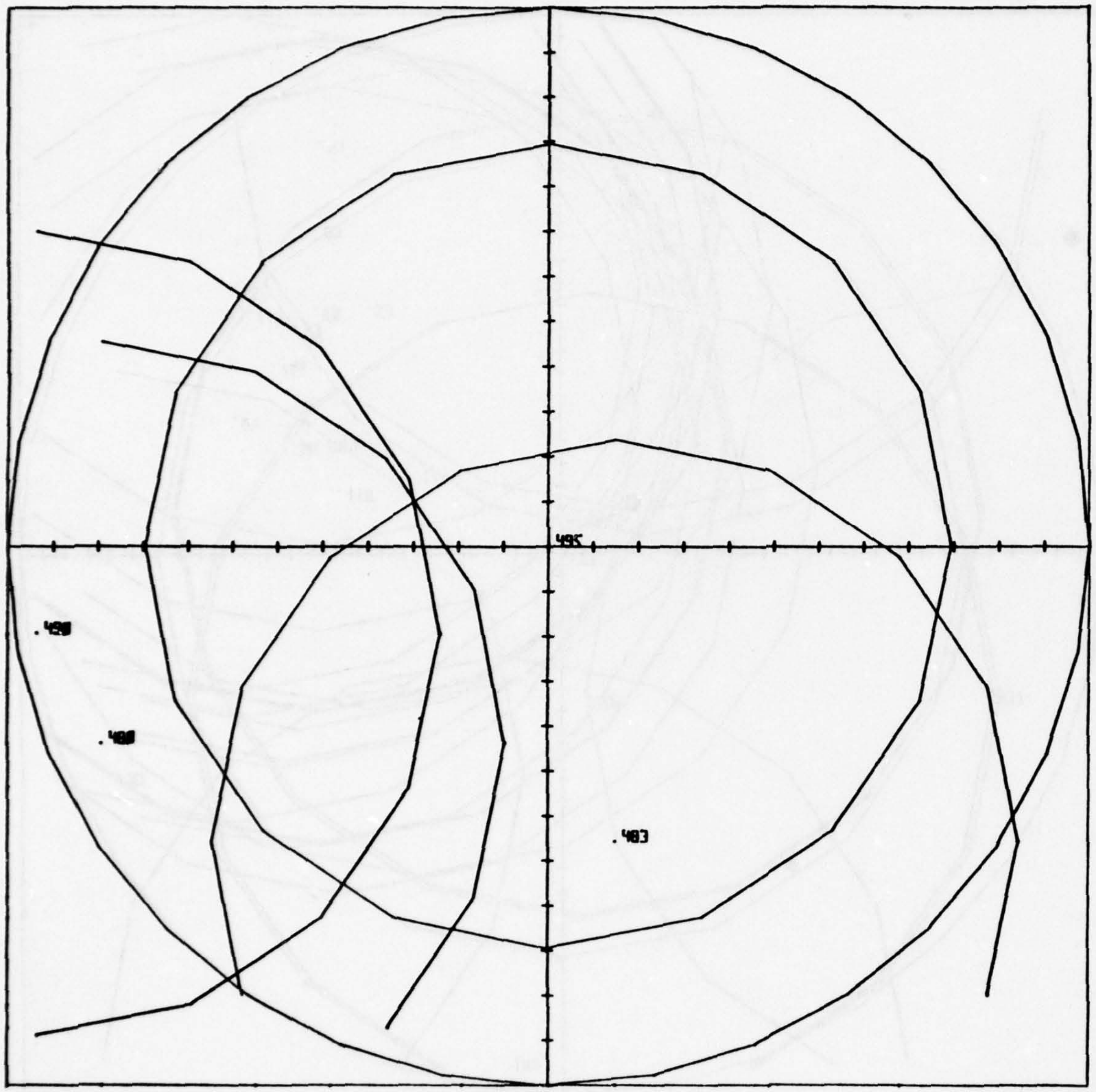
ROC

ROCHESTER, N. Y.



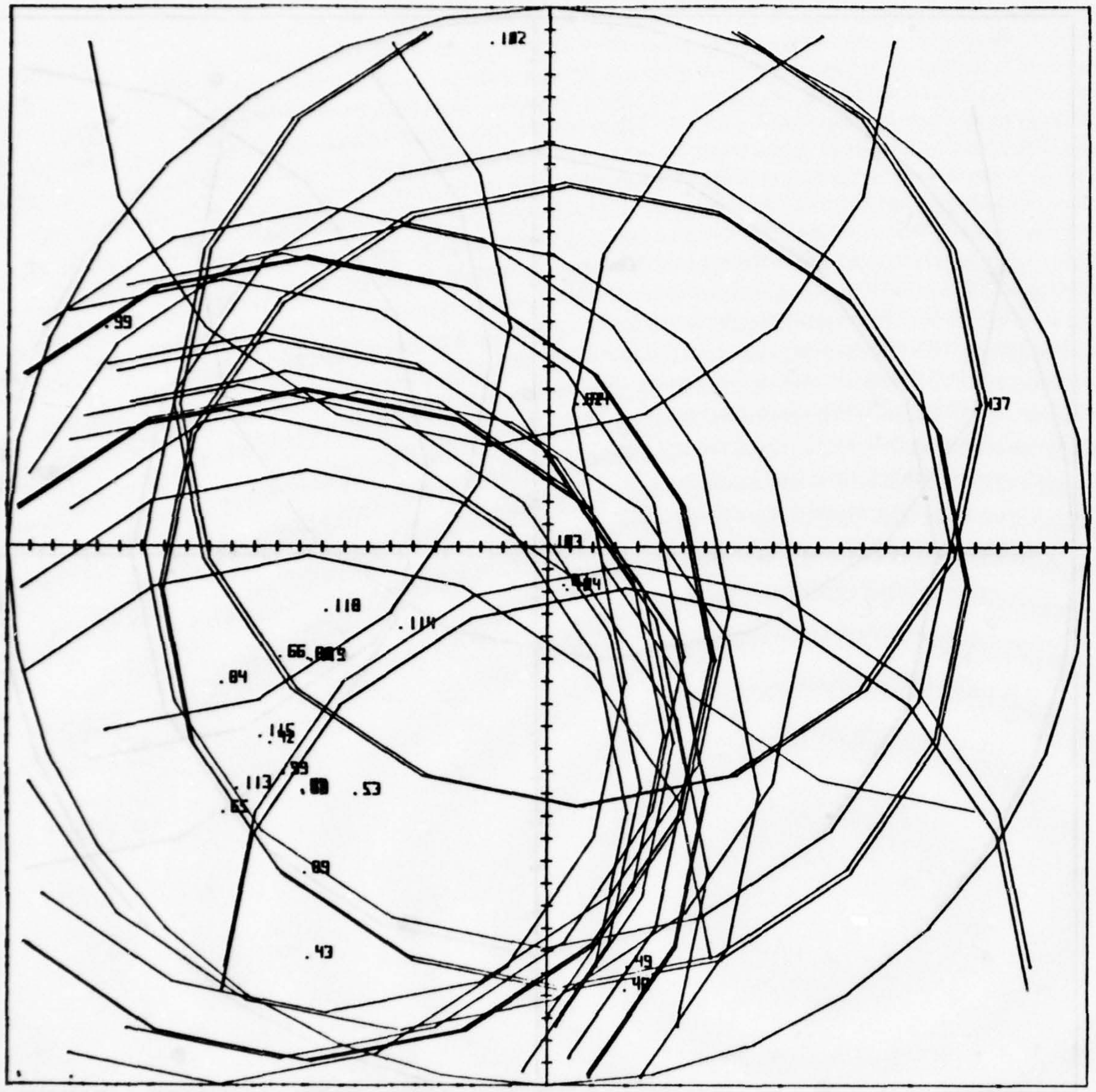
IGHT 1000 GIVES RADIUS 44.7213
ZE OF AREA (RADIUS (NM)) 60

LE # 495 USED AS NOMINAL SITE

RADAR # 480 WITHIN 54.15740715
RADAR # 483 WITHIN 33.69228154
RADAR # 490 WITHIN 57.54716423
RADAR # 495 WITHIN 0 NM
*** ***** ***** ***** *****

S A C

SACRAMENTO, CAL



CAT 4000 GIVES RADIUS 89.44271
E OF AREA RADIUS (NM) 120

E # 103 USED AS NOMINAL SITE

RADAR	# 42	WITHIN	75.29761136	NM
RADAR	# 43	WITHIN	105.7502725	NM
RADAR	# 44	WITHIN	32.59914897	NM
RADAR	# 47	WITHIN	100.0718594	NM
RADAR	# 48	WITHIN	100.1237675	NM
RADAR	# 49	WITHIN	95.16020693	NM
RADAR	# 53	WITHIN	69.54628895	NM
RADAR	# 65	WITHIN	92.42209464	NM
RADAR	# 66	WITHIN	64.02337060	NM
RADAR	# 67	WITHIN	76.69811118	NM
RADAR	# 68	WITHIN	77.01349366	NM
RADAR	# 69	WITHIN	77.01349366	NM
RADAR	# 80	WITHIN	58.65021865	NM
RADAR	# 81	WITHIN	58.65021865	NM
RADAR	# 82	WITHIN	32.27615467	
RADAR	# 83	WITHIN	9.222392949	
RADAR	# 84	WITHIN	78.17496072	
RADAR	# 89	WITHIN	90.28365658	
RADAR	# 93	WITHIN	77.27827822	
RADAR	# 94	WITHIN	77.27827822	
RADAR	# 99	WITHIN	109.3670049	
DAR	# 102	WITHIN	112.7074013	
DAR	# 103	WITHIN	0 NM	
DAR	# 104	WITHIN	10.4183025	
DAR	# 113	WITHIN	87.19931690	
DAR	# 114	WITHIN	3.22076297	
DAR	# 115	WITHIN	77.18418579	
DAR	# 118	WITHIN	50.98422539	
DAR	# 119	WITHIN	58.0382.7599	
DAR	# 437	WITHIN	49.73565775	NM

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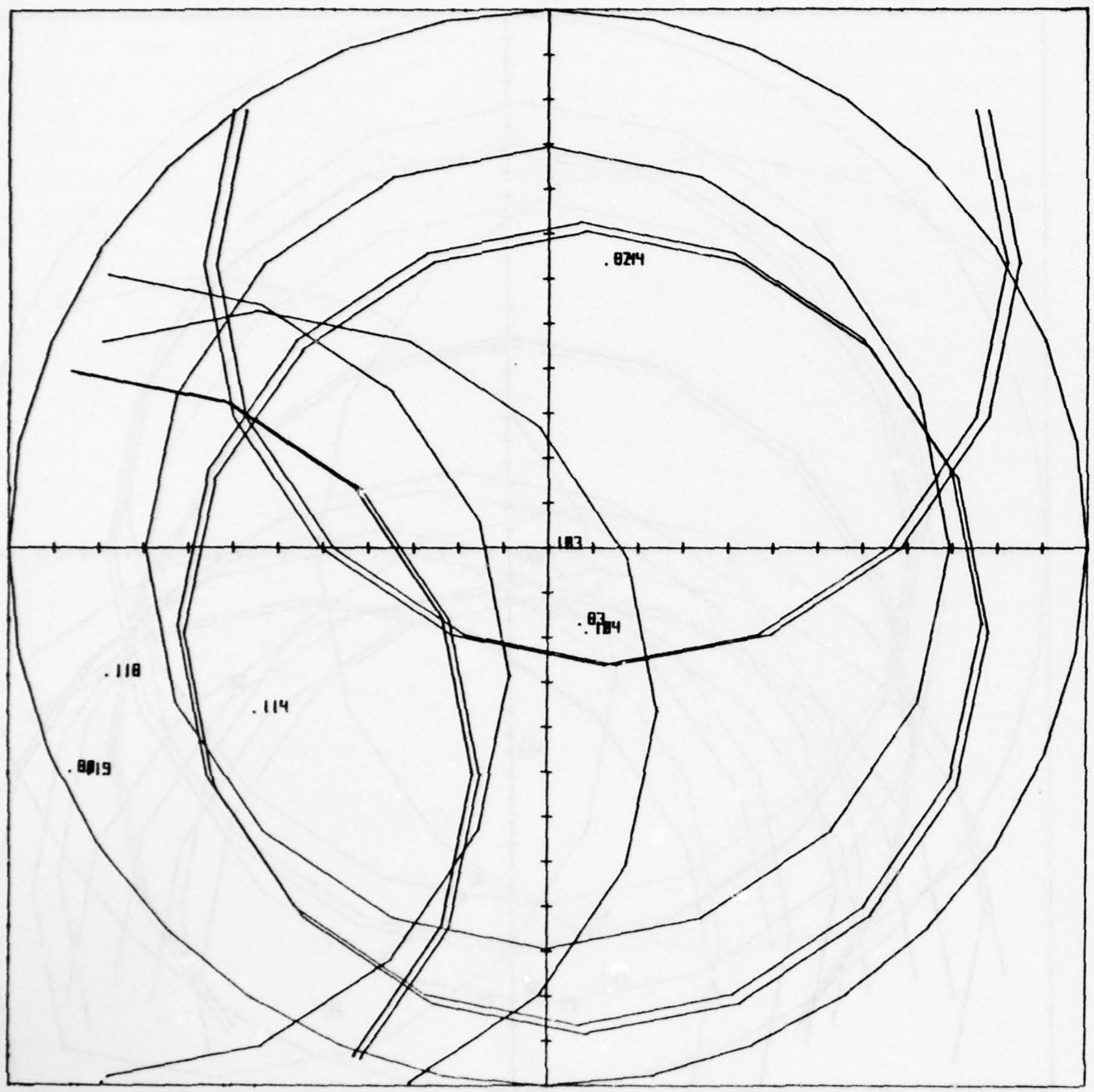
S A C

SACRAMENTO, CAL



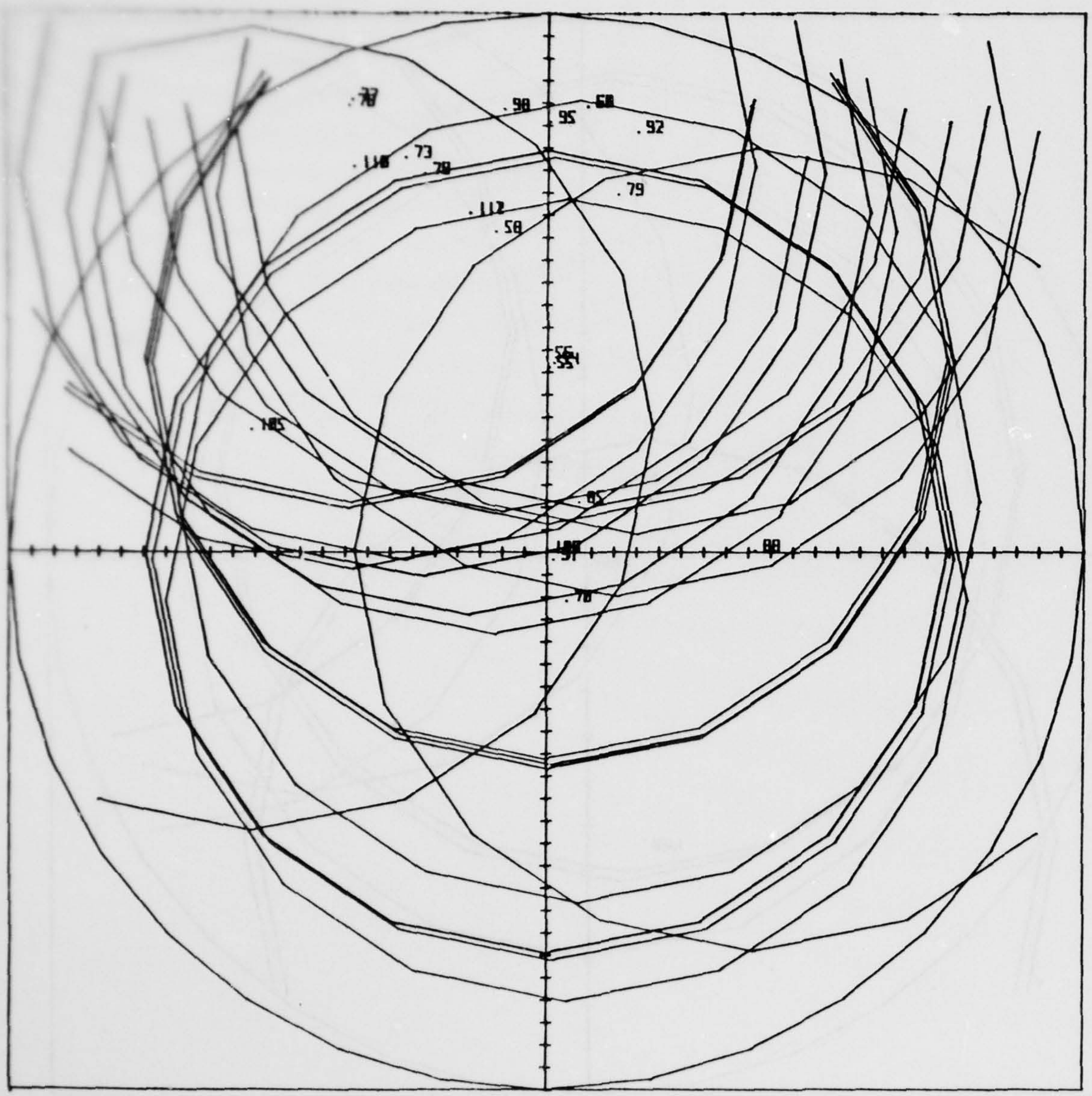
[illegible] GIVE RADIUS 44.721[illegible]
OF AREA RADIUS (NM) 60

[illegible] # 103 USED AS NOMINAL SITE

RADAR	# 44	WITHIN	32.5[illegible]14897	NM
RADAR	# 80	WITHIN	58.6502186[illegible]	NM
RADAR	# 81	WITHIN	58.6502186[illegible]	NM
RADAR	# 82	WITHIN	52.2[illegible]015467	NM
RADAR	# 83	WITHIN	9.222[illegible]92949	NM
RADAR	# 103	WITHIN	0	NM
RADAR	# 104	WITHIN	10.413[illegible]025	
RADAR	# 114	WITHIN	37.2[illegible]0[illegible]6[illegible]97	
RADAR	# 118	WITHIN	50.[illegible]842[illegible]5[illegible]9	
RADAR	# 119	WITHIN	58.[illegible]03877599	

S A N

SAN DIEGO, CAL



[illegible] 4000 GIVES RADIUS 89.442719[illegible]
[illegible] OF AREA RADIUS (NM) 120

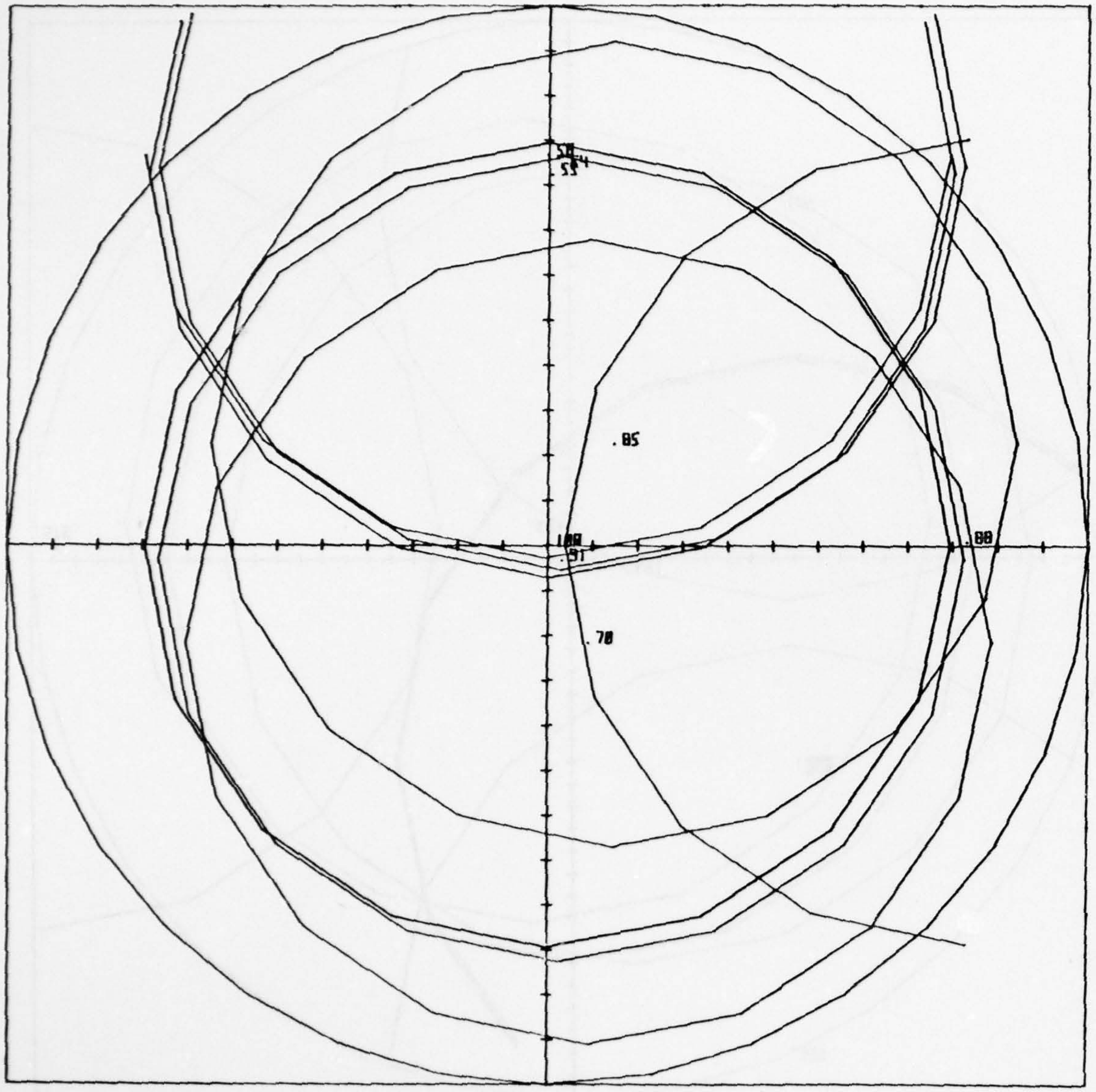
[illegible] # 108 USED AS NOMINAL SITE

RADAR # 54	WITHIN	42.0666894	NM
RADAR # 55	WITHIN	41.1598405	NM
RADAR # 56	WITHIN	43.34551033	NM
RADAR # 58	WITHIN	72.1259[illegible]	NM
RADAR # 59	WITHIN	99.0[illegible]	NM
RADAR # 60	WITHIN	99.0[illegible]	NM
RADAR # 70	WITHIN	11.72319747	NM
RADAR # 73	WITHIN	95.30[illegible]	NM
RADAR # 74	WITHIN	88.50411655	NM
RADAR # 75	WITHIN	88.50411655	NM
RADAR # 76	WITHIN	108.572329	NM
RADAR # 77	WITHIN	109.498412	NM
RADAR # 79	WITHIN	81.23652373	NM
RADAR # 85	WITHIN	13.44451955	NM
RADAR # 88	WITHIN	46.61722486	N[illegible]
RADAR # 91	WITHIN	2.20446208	N[illegible]
RADAR # 92	WITHIN	95.6[illegible]81334	N[illegible]
RADAR # 95	WITHIN	95.24918852	N[illegible]
RADAR # 98	WITHIN	98.97310159	N[illegible]
RADAR # 105	WITHIN	71.2044762	[illegible]
RADAR # 106	WITHIN	0 NM	
RADAR # 107	WITHIN	0 NM	
RADAR # 108	WITHIN	0 NM	
RADAR # 110	WITHIN	95.9[illegible]	[illegible]
RADAR # 111	WITHIN	72.2972663	[illegible]
RADAR # 112	WITHIN	72.2972663	[illegible]

*** ***** ***** ***** *****

S A N

SAN DIEGO, CAL



[illegible] 1000 GIVES RADIUS 44.721359
[illegible] AREA RADIUS (NM) 60

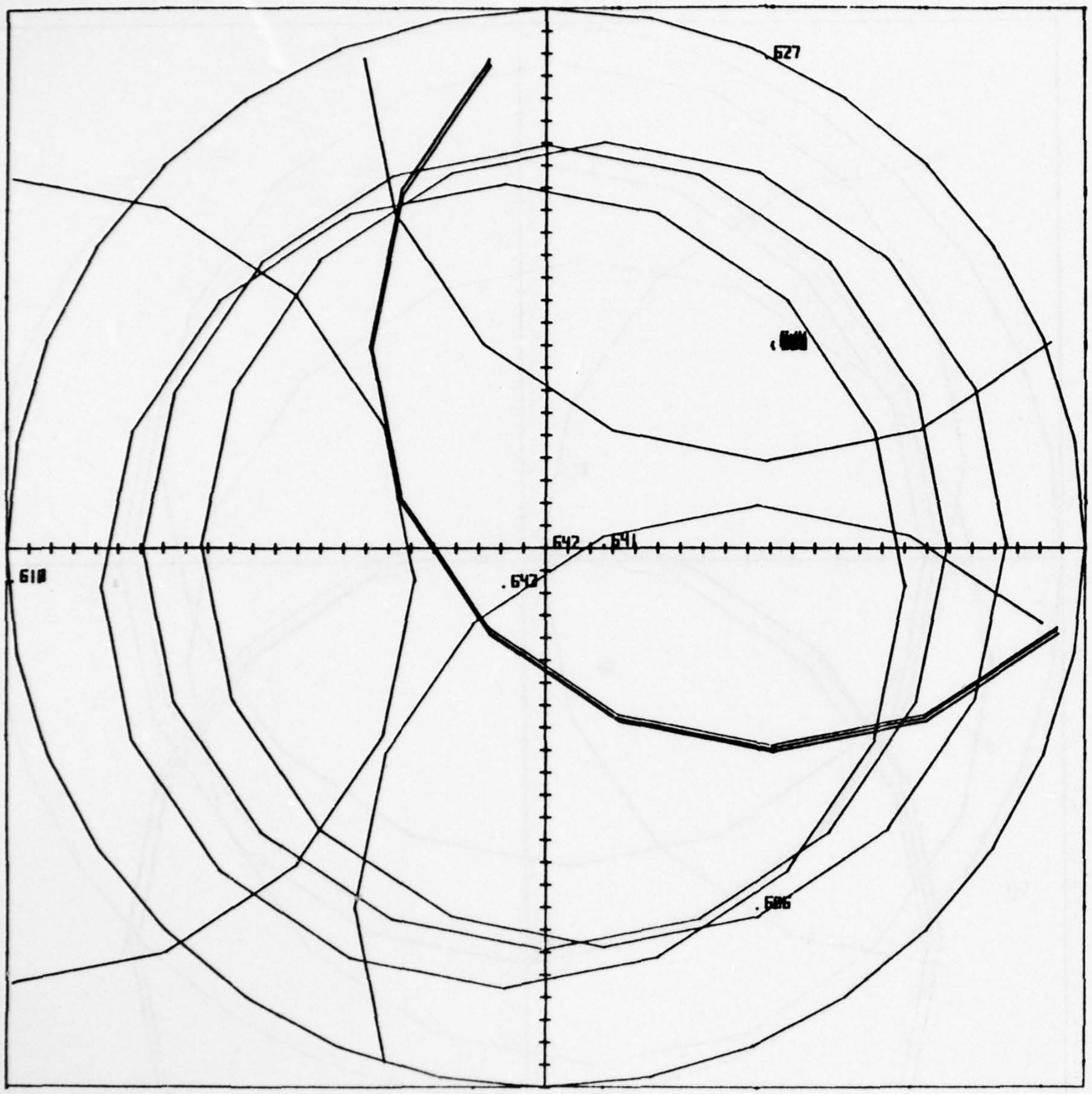
[illegible] # 108 USED AS NOMINAL SITE

RADAR	#	54	WITHIN	42.[illegible]6894	N
RADAR	#	55	WITHIN	41.1[illegible]905	N
RADAR	#	56	WITHIN	4[illegible].[illegible]4551033	N.
[illegible]	#	[illegible]	WITHIN	11.[illegible]31[illegible]247	NM
[illegible]	#	[illegible]	WITHIN	1[illegible].4445[illegible]	NM
RADAR	#	88	WITHIN	46.[illegible]1727486	NM
RADAR	#	91	WITHIN	2.220446288	NM
RADAR	#	106	WITHIN	0	NM
RADAR	#	107	WITHIN	0	NM
RADAR	#	108	WITHIN	0	NM

*** ***** ***** ***** *****

S A T

SAN ANTONIO, TEXAS



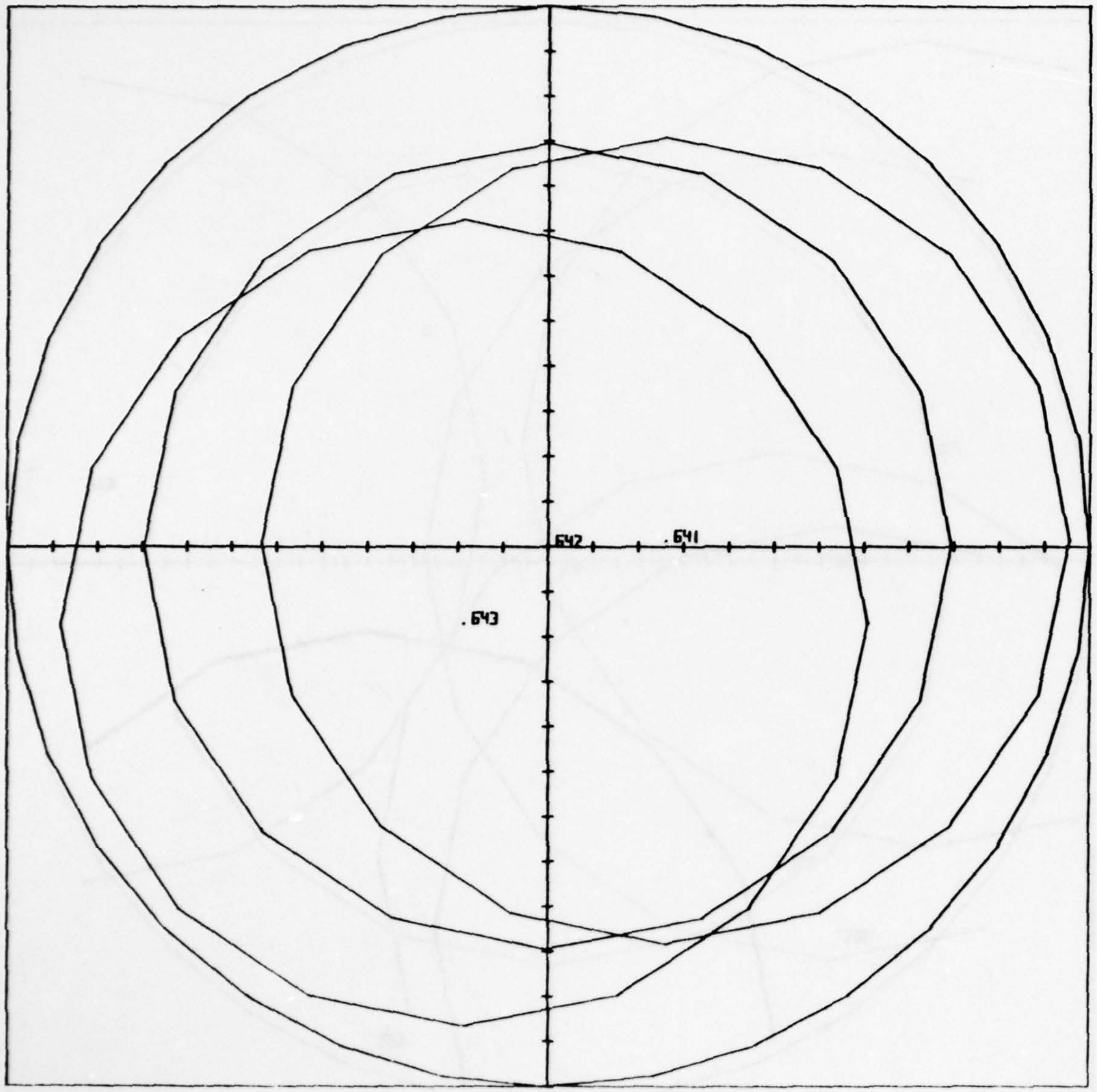
HEIGHT 4000 GIVES RADIUS 89.44271
SIZE OF AREA RADIUS (NM) 120

SITE # 642 USED AS NOMINAL SITE

RADAR # 604 WITHIN 67.99407077 NM
RADAR # 606 WITHIN 95.87344 NM
RADAR # 607 WITHIN 67.14028794 NM
RADAR # 608 WITHIN 67.14028794 NM
RADAR # 609 WITHIN 67.34101563 NM
RADAR # 610 WITHIN 118.884445 NM
RADAR # 627 WITHIN 114.2366596 NM
RADAR # 641 WITHIN 13.06542408 NM
RADAR # 642 WITHIN 0 NM
RADAR # 643 WITHIN 12.64107335 NM
***** ***** ***** ***** *****

S A T

SAN ANTONIO, TEXAS



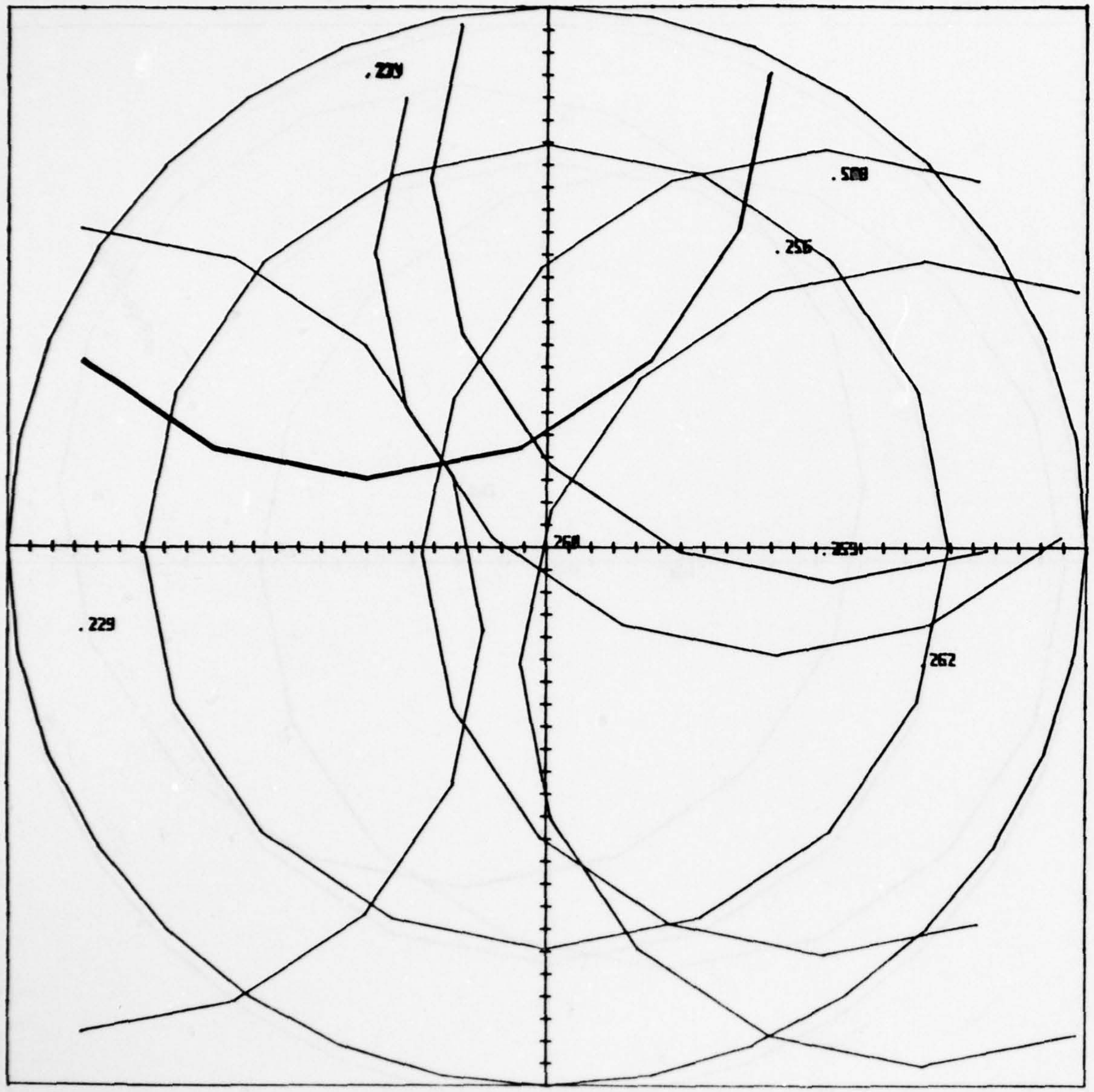
IGHT 1000   GIVES RADIUS 44.7213
ZL OF AREA (RADIUS (NM)) 60

LE # 642 USED AS NOMINAL SITE

RADAR # 641 WITHIN 13.06543488
RADAR # 642 WITHIN 0   NM
RADAR # 643 WITHIN 12.64107335
*** ***** ***** ***** *****

S D F

LOUISVILLE, KY.



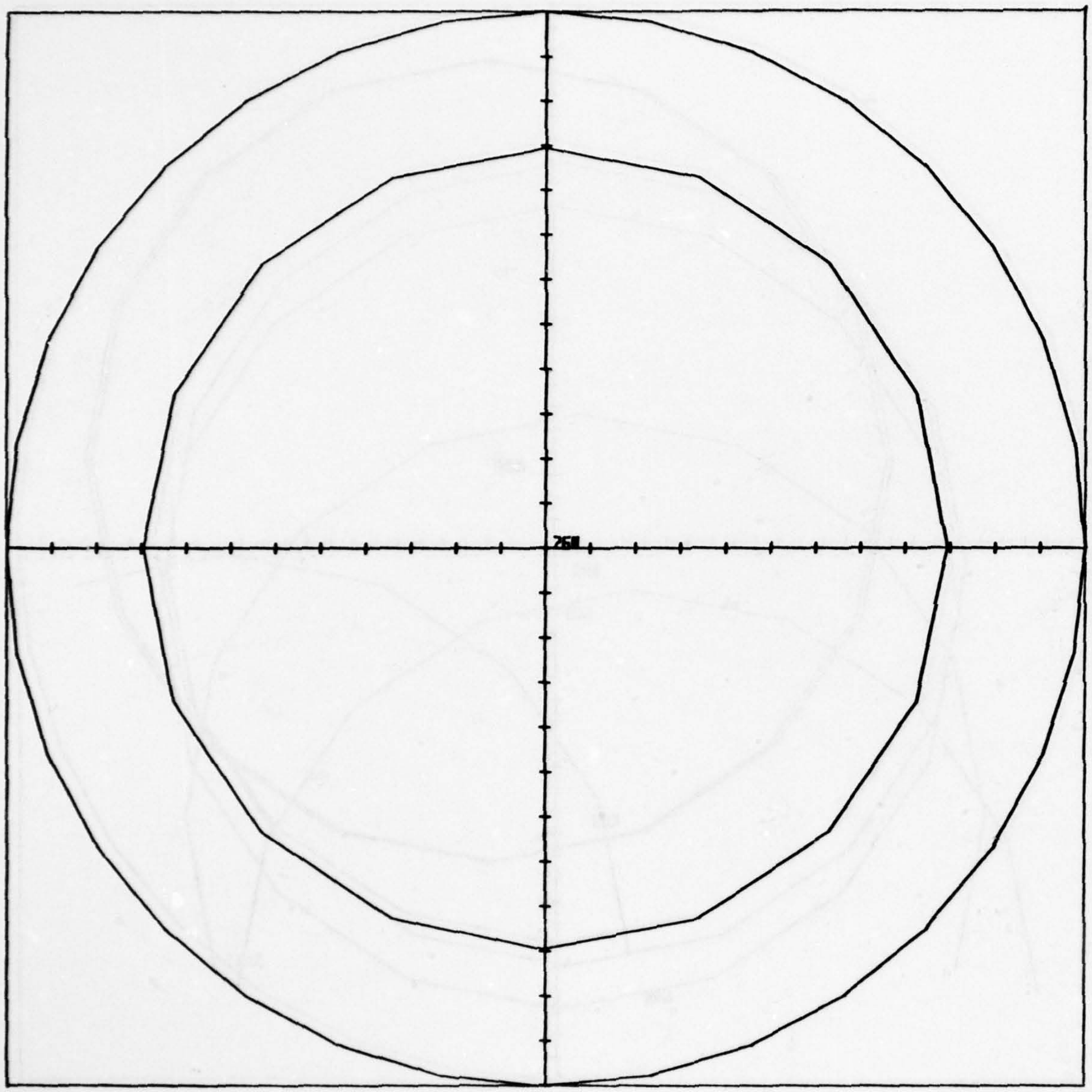
HEIGHT 4000 GIVES RADIUS 89.41271
SIZE OF AREA RADIUS (NM) 120

FILE # 260 USED AS NOMINAL SITE

RADAR # 229 WITHIN 105.1497514
RADAR # 233 WITHIN 111.9122610
RADAR # 234 WITHIN 112.2[illegible]
RADAR # 256 WITHIN 83.0[illegible]
RADAR # 259 WITHIN 61.7033470[illegible]
RADAR # 260 WITHIN 0 NM
RADAR # 262 WITHIN [illegible].6744429
RADAR # 508 WITHIN 103.[illegible]
RADAR # 509 WITHIN 103.[illegible]
***** ***** ***** ***** *****

S D F

LOUISVILLE, KY.



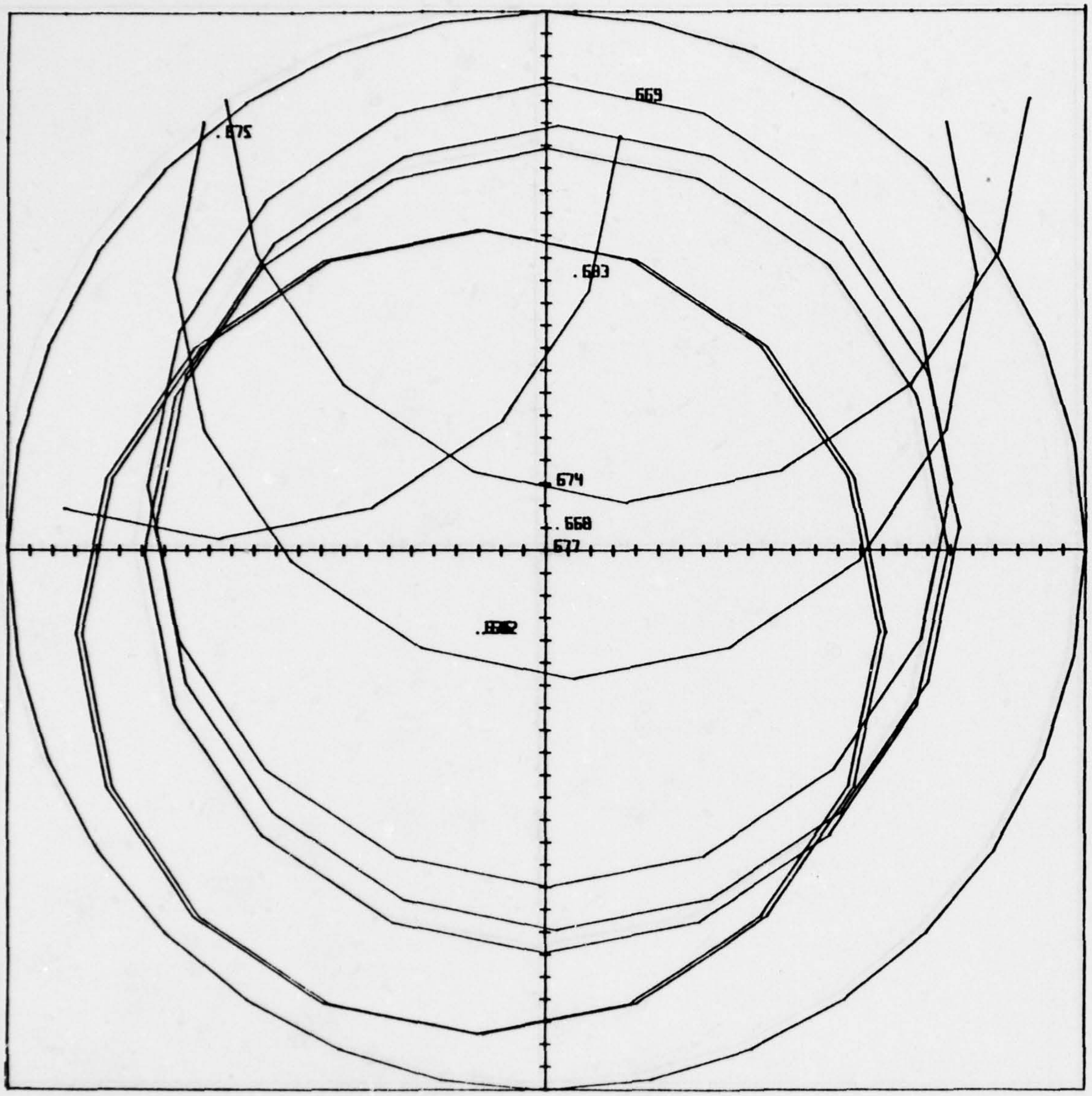
IGHT 1000 GIVES RADIUS 44.7213
ZE OF AREA RADIUS (NM) 60

E # 260 USED AS NOMINAL SITE

RADAR # 260 WITHIN 6 NM
*** ***** ***** ***** *****

SEA

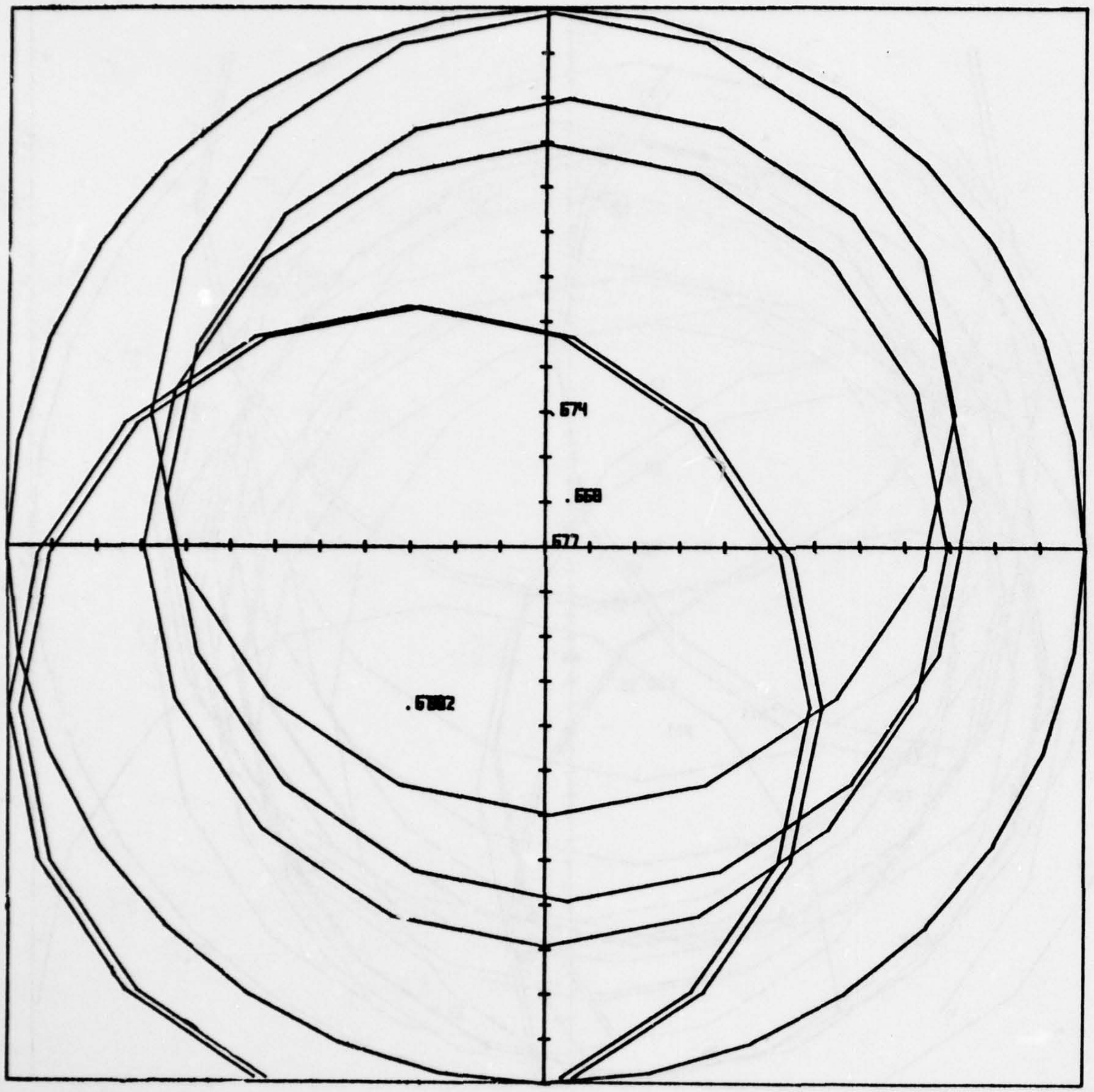
SEATTLE/TACOMA, WASH.



AT 4000 [illegible] RADIUS 89.44271910
OF AREA RADIUS (NM) 120

[illegible] USED AS NOMINAL SITE

[illegible] # [illegible] WITHIN 5.66[illegible] NM
[illegible] # [illegible] WITHIN [illegible]1.91[illegible] NM
[illegible] # [illegible]74 WITHIN 14.[illegible] NM
[illegible] # [illegible]75 WITHIN 117.[illegible] NM
[illegible] # [illegible] WITHIN 23.[illegible] NM
[illegible] # [illegible] WITHIN 0 NM
[illegible] # [illegible] WITHIN 22.[illegible]7234 NM
[illegible] # [illegible] WITHIN [illegible]1.44715[illegible] NM
***** ***** ***** *****



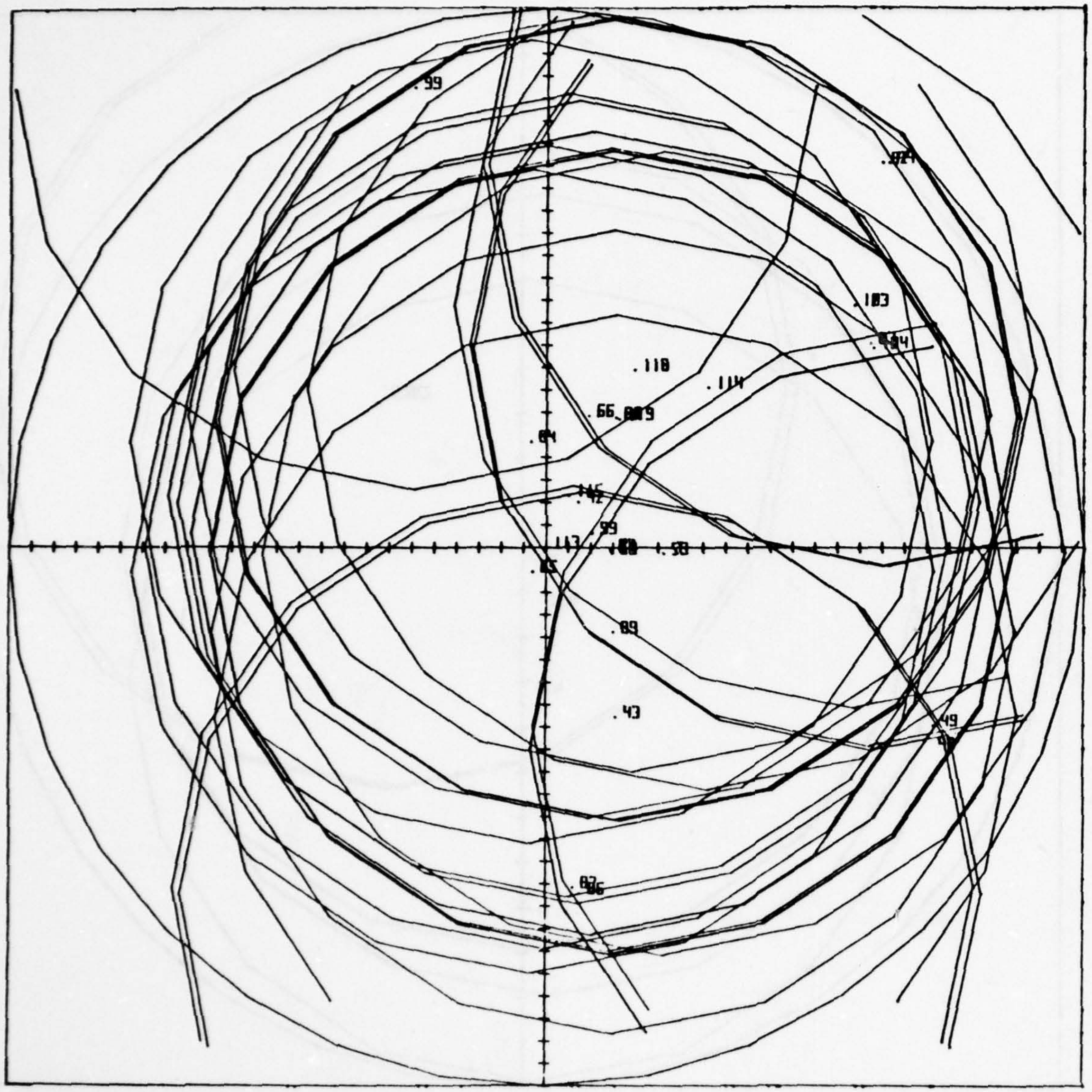
S E A

SEATTLE/TACOMA, WASH.

HEIGHT 1000   GIVES RADIUS 44.72135955
SIZE OF AREA <RADIUS (NM)> 60

FILE # 677 USED AS NOMINAL SITE

RADAR # 668 WITHIN 5.663573925 NM
RADAR # 674 WITHIN 14.69846848 NM
RADAR # 676 WITHIN 23.65867480 NM
RADAR # 677 WITHIN 0 NM
RADAR # 682 WITHIN 22.8677234 NM
***** ***** ***** ***** *****



S F O

SAN FRANCISCO, CAL

ALT 4000 GIVES RADIUS 89.442719
OR OPEN RADIUS (NM) 120

113 USED AS NOMINAL SITE

RADAR #	42	WITHIN	12.44695372	NM
RADAR #	43	WITHIN	40.90615193	NM
RADAR #	44	WITHIN	114.6166692	NM
RADAR #	47	WITHIN	97.04266048	NM
RADAR #	48	WITHIN	97.05473628	NM
RADAR #	49	WITHIN	35.3013089	NM
RADAR #	53	WITHIN	26.28405129	NM
RADAR #	65	WITHIN	6.175129314	NM
RADAR #	66	WITHIN	30.69007162	NM
RADAR #	67	WITHIN	14.50589115	NM
RADAR #	68	WITHIN	14.79015797	NM
RADAR #	69	WITHIN	14.79015797	NM
RADAR #	80	WITHIN	32.68703612	NM
RADAR #	81	WITHIN	32.68703612	NM
RADAR #	82	WITHIN	113.6791402	NM
RADAR #	83	WITHIN	85.27793458	NM
RADAR #	84	WITHIN	23.69437119	NM
RADAR #	86	WITHIN	27.54000085	NM
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RADAR #	89	WITHIN	24.16499477	NM
RADAR #	93	WITHIN	10.74922642	NM
RADAR #	94	WITHIN	10.74922642	NM
RADAR #	99	WITHIN	106.4633145	NM
RADAR #	103	WITHIN	27.15921690	NM
RADAR #	104	WITHIN	65.33677884	NM
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RADAR #	114	WITHIN	50.65808080	NM
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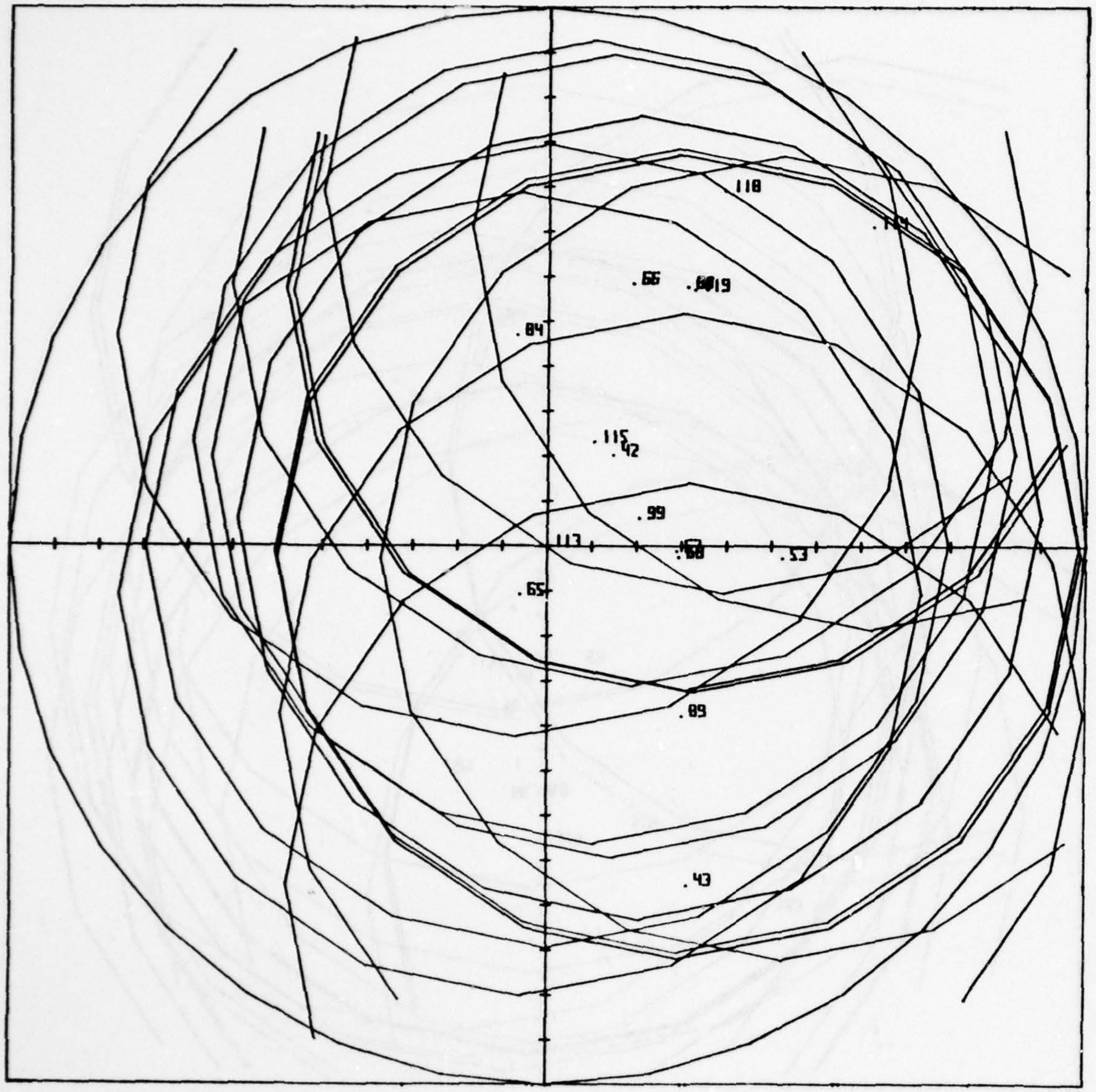
RADAR #	118	WITHIN	44.11499923	NM
RADAR #	119	WITHIN	32.84921677	NM



SFO

SAN FRANCISCO, CAL

**** ***** ***** ***** *****
FLIGHT 1000 GIVES RADIUS 44.721359
SIZE OF AREA (RADIUS (NM) 60

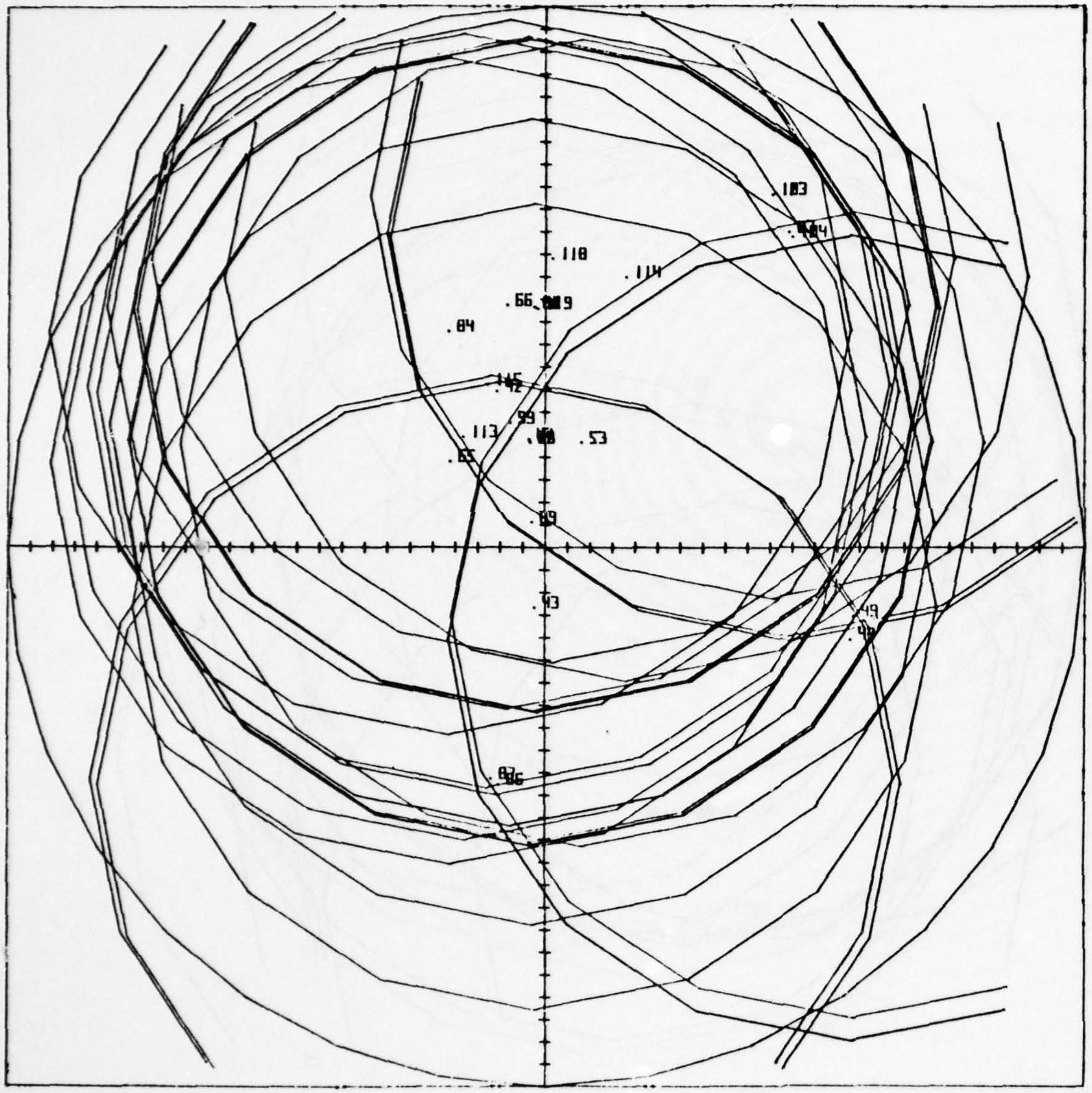
FILE # 113 USED AS NOMINAL SITE

RADAR # 42	WITHIN	12.44695372	NM
RADAR # 43	WITHIN	40.90615193	NM
RADAR # 53	WITHIN	26.28405129	NM
RADAR # 65	WITHIN	6.175129314	NM
RADAR # 66	WITHIN	30.69007162	NM
RADAR # 67	WITHIN	14.50589115	NM
RADAR # 68	WITHIN	14.79015797	NM
RADAR # 69	WITHIN	14.79015797	NM
RADAR # 80	WITHIN	32.68703612	NM
RADAR # 81	WITHIN	32.68703612	NM
RADAR # 84	WITHIN	23.69437119	NM
RADAR # 89	WITHIN	24.16499477	
RADAR # 93	WITHIN	10.74932643	
RADAR # 94	WITHIN	10.74932643	
RADAR # 113	WITHIN	0 NM	
RADAR # 114	WITHIN	50.65908060	
RADAR # 115	WITHIN	12.70056327	
RADAR # 118	WITHIN	44.11499925	
RADAR # 119	WITHIN	32.84921677	

*** ***** ***** ****** *****

SJC

SAN JOSE, CAL



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ERROR	#	48	WITHIN 20.[illegible]	NM
ERROR	#	49	WITHIN 20.24849543	NM
ERROR	#	53	WITHIN 24.526[illegible]	NM
ERROR	#	65	WITHIN [illegible]	NM
ERROR	#	66	WITHIN 54.[illegible]	NM
ERROR	#	67	WITHIN [illegible]	NM
ERROR	#	68	WITHIN [illegible]	NM
ERROR	#	69	WITHIN [illegible]	NM
ERROR	#	[illegible]	WITHIN [illegible]	NM
ERROR	#	[illegible]	WITHIN [illegible]	NM
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ERROR	#	94	WITHIN [illegible]	NM
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ERROR	#	104	WITHIN [illegible]	NM
ERROR	#	113	WITHIN [illegible]	NM
ERROR	#	114	WITHIN [illegible]	NM
ERROR	#	115	WITHIN [illegible]	NM
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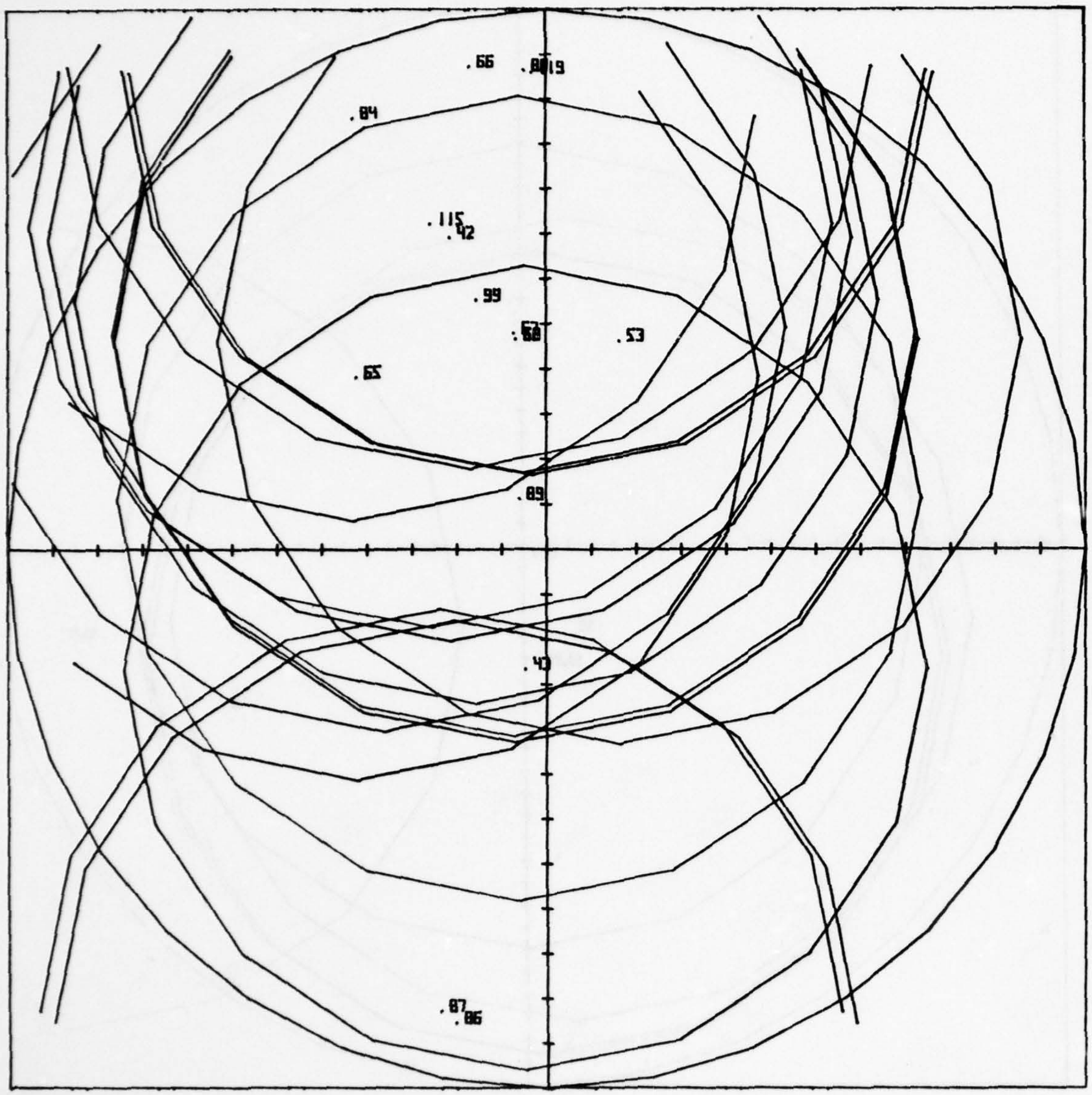
S J C

SAN JUSE, CAL



HEIGHT 1000 GIVES RADIUS 44.72135
SIZE OF AREA <RADIUS (NM)> 60

FILE NAME SJC USED AS NOMINAL SITE

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RADAR #	65	WITHIN	28.42785979	NM
RADAR #	66	WITHIN	54.3222552	NM
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RADAR #	68	WITHIN	23.48640322	NM
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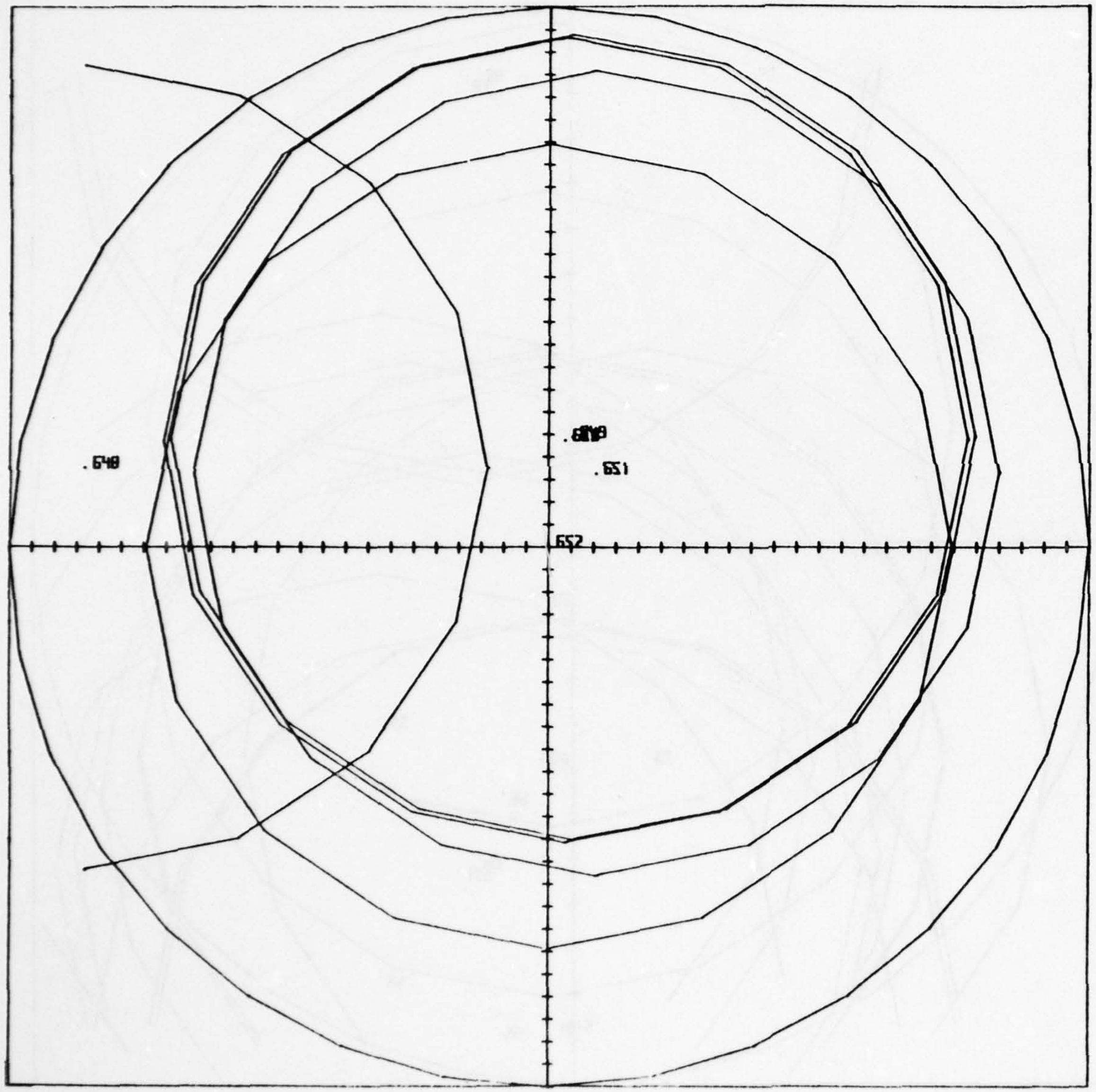
RADAR #	80	WITHIN	53.24908027	NM
RADAR #	81	WITHIN	53.24908027	NM
RADAR #	84	WITHIN	52.51749292	NM
RADAR #	86	WITHIN	53.62460189	NM
RADAR #	87	WITHIN	52.73201557	NM
RADAR #	89	WITHIN	6.339843820	NM
RADAR #	93	WITHIN	28.66680518	NM
RADAR #	94	WITHIN	28.66680518	NM
RADAR #	113	WITHIN	30.42346436	NM
RADAR #	115	WITHIN	38.28399514	NM
RADAR #	119	WITHIN	52.95309312	NM

***** ***** ***** ***** *****

S L C

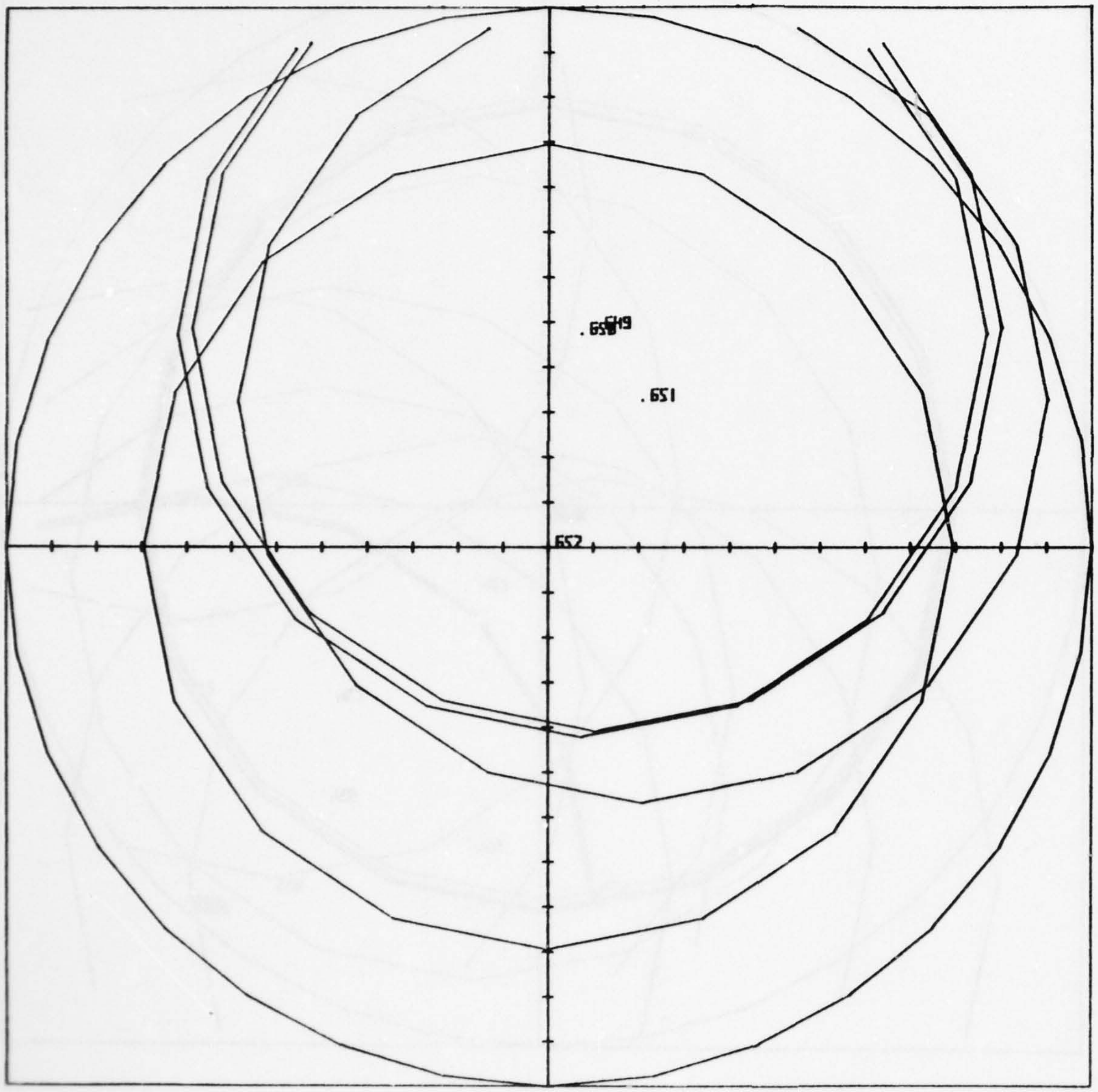
SALT LAKE CITY, UTAH



ALT 4000 GIVES RADIUS 89.4427190
R. OF AREA RADIUS (NM) 1.30

E # 652 USED AS NOMINAL SITE

NODE # 648 WITHIN 104.6205771 NM
NODE # 649 WITHIN 24.9081657 NM
NODE # 650 WITHIN 23.9599311 NM
NODE # 651 WITHIN 19.3510702 NM
NODE # 652 WITHIN 0 NM



S L C

SALT LAKE CITY, UTAH

IGHT 1000 GIVES RADIUS 44.7213
ZE OF AREA RADIUS (NM) 60

E # 652 USED AS NOMINAL SITE

RADAR # 649 WITHIN 24.90818579
RADAR # 650 WITHIN 23.95993311
RADAR # 651 WITHIN 19.35107802
RADAR # 652 WITHIN 0 NM
*** ***** ***** ***** *****

AD-A061 948 FEDERAL AVIATION ADMINISTRATION WASHINGTON D C OFFIC--ETC F/G 17/7
FAA BCAS CONCEPT. VOLUME IIIA. APPENDICES A-E,(U)
APR 78 E J KOENKE
UNCLASSIFIED FAA-EM-78-5-III-A NL

4 OF 5
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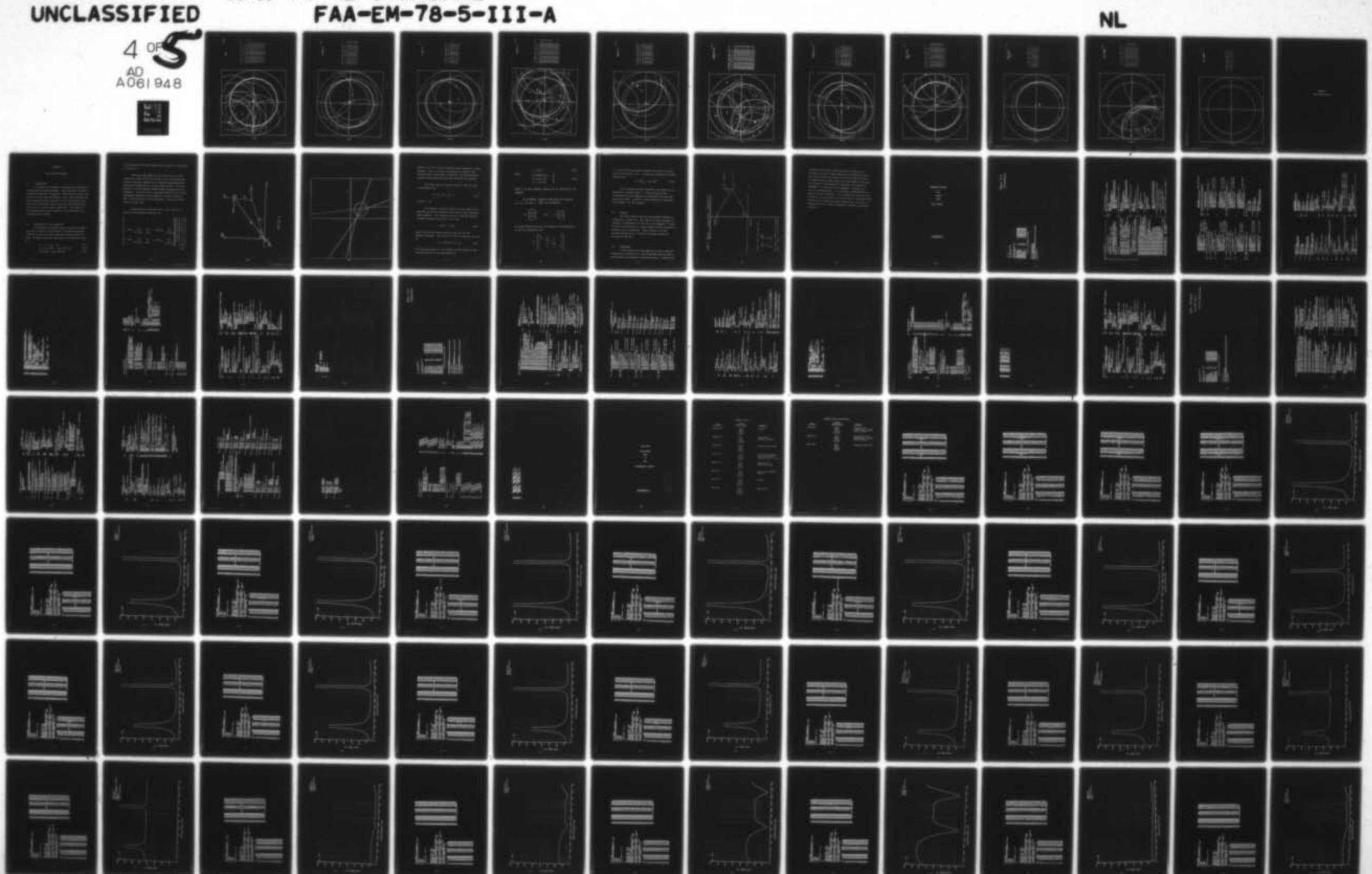
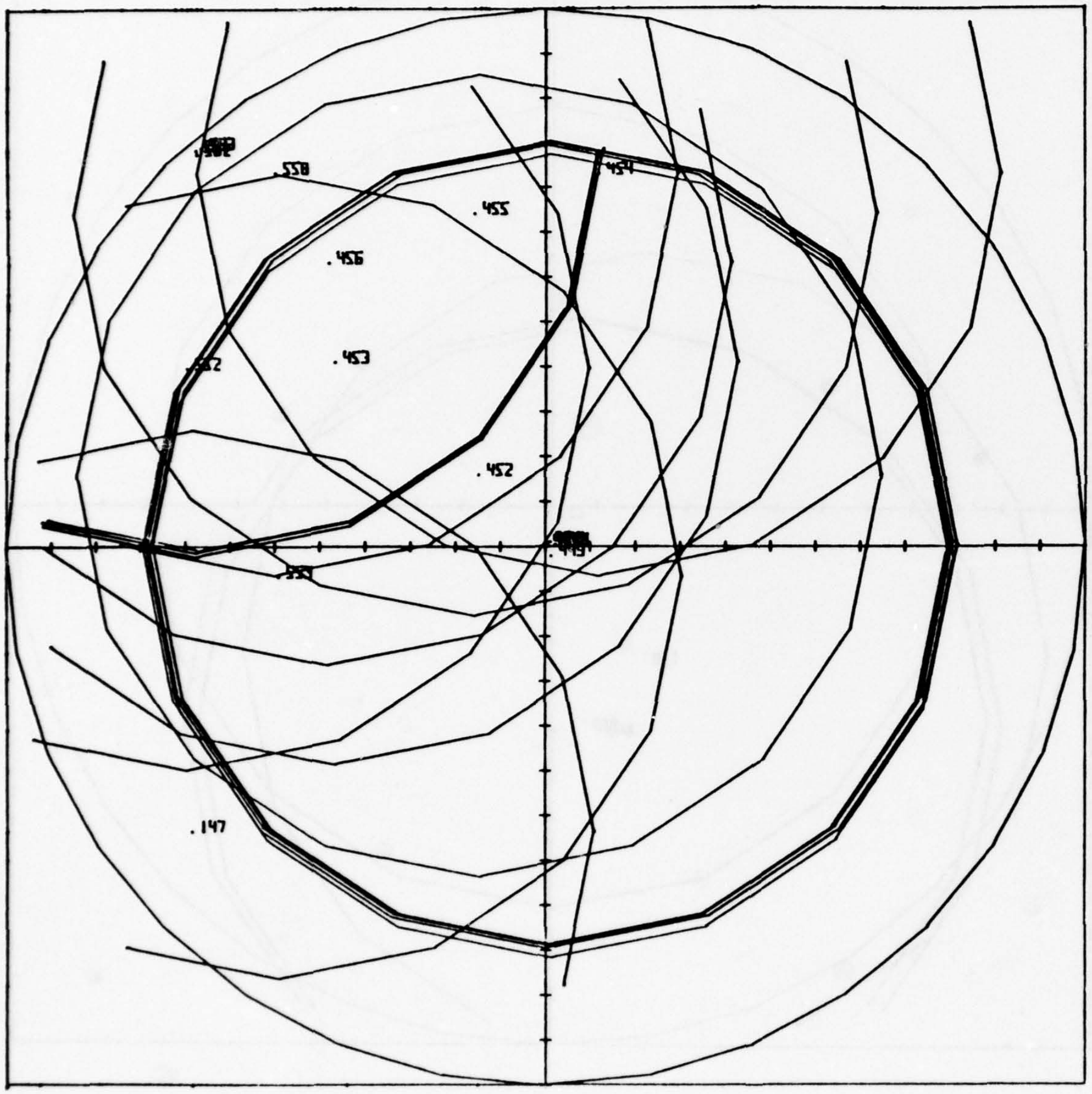


OF 5

948

S R D S

NAFEC



HEIGHT 1000 GIVES RADIUS 44.72135955
SIZE OF AREA RADIUS (NM) 60

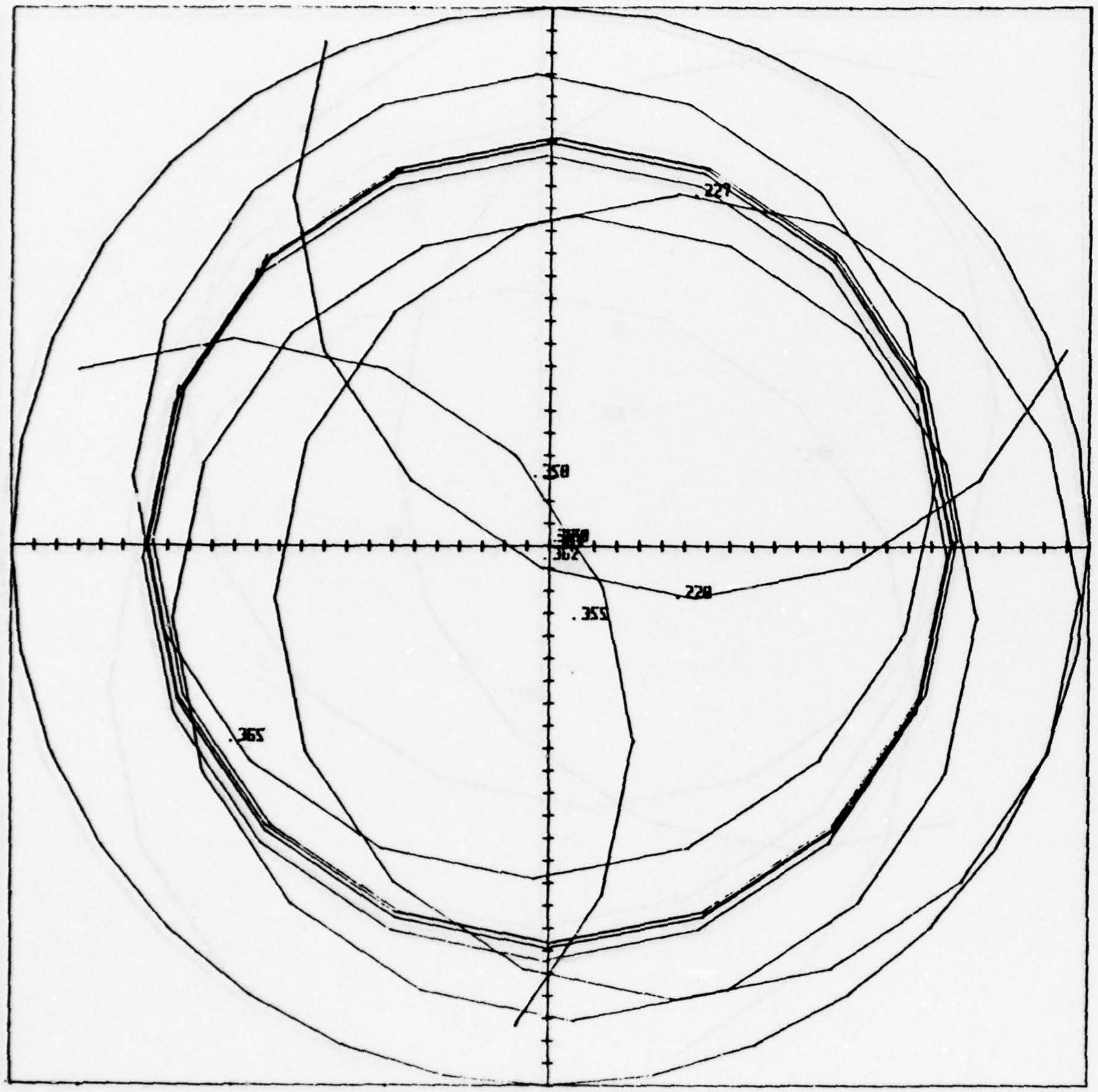
SITE # 447 USED AS NOMINAL SITE

RADAR #	147	WITHIN	50.54449212	N
RADAR #	446	WITHIN	1.118028749	N
RADAR #	447	WITHIN	0 NM	
RADAR #	448	WITHIN	0.753229264	P
RADAR #	449	WITHIN	1.262787104	I
RADAR #	450	WITHIN	1.118028749	I
RADAR #	451	WITHIN	0.43.587877	I
RADAR #	452	WITHIN	10.84462096	I
RADAR #	453	WITHIN	31.06829027	I
RADAR #	454	WITHIN	41.86136763	
RADAR #	455	WITHIN	37.84962032	
RADAR #	456	WITHIN	34.67636788	
RADAR #	552	WITHIN	44.57363988	
RADAR #	553	WITHIN	29.75108026	
RADAR #	558	WITHIN	51.22013142	
RADAR #	561	WITHIN	58.72580008	
RADAR #	562	WITHIN	58.30911916	
RADAR #	563	WITHIN	58.51609536	

+++++ +++++ +++++ +++++ +++++

S T L

ST. LOUIS, MO.



.IGHT 4000 GIVES RADIUS 89.44271910
E OF AREA RADIUS (NM) 120

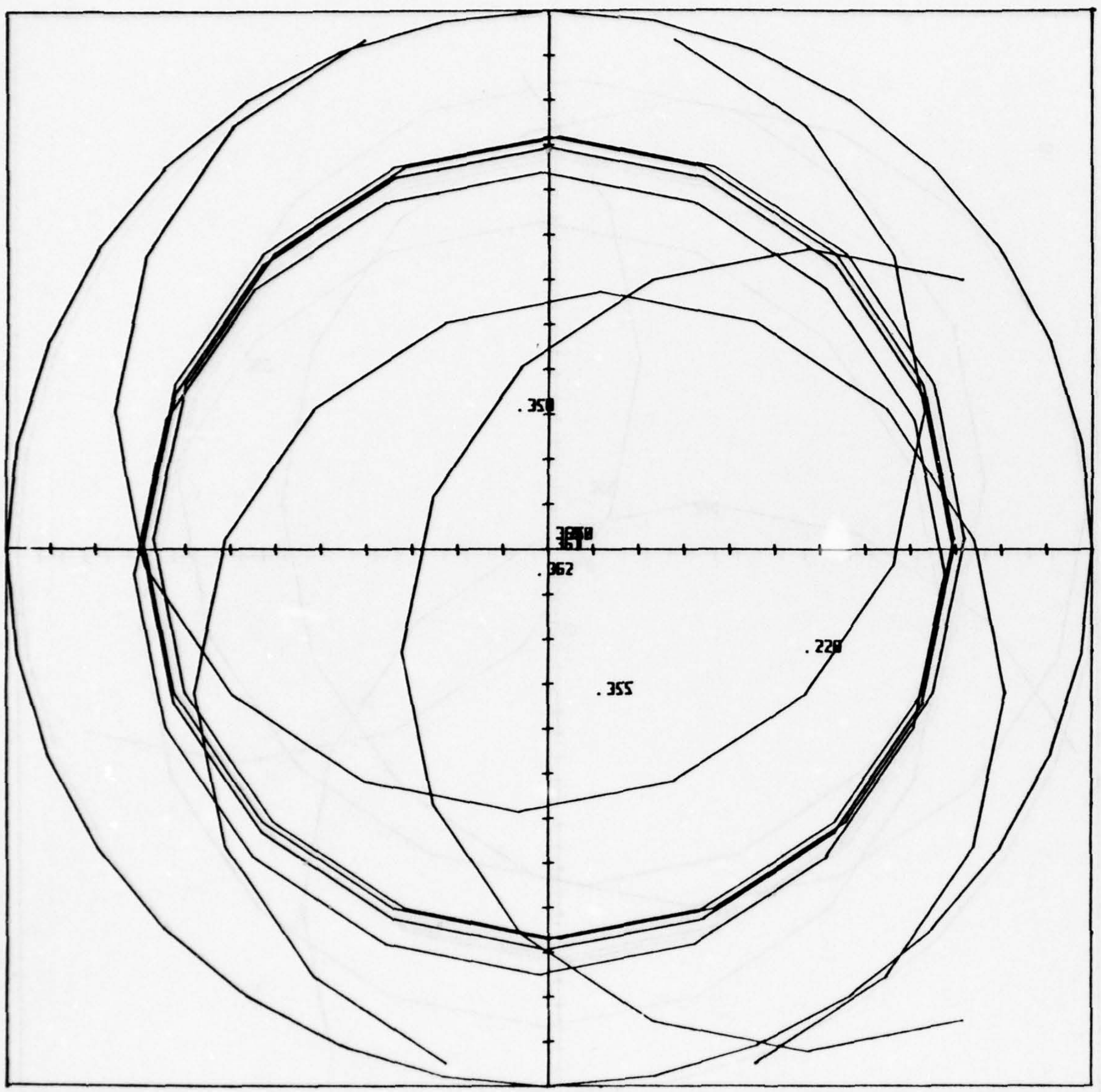
E # 361 USED AS NOMINAL SITE

MARK #	227	WITHIN	84.35154953	NM
MARK #	228	WITHIN	30.77025784	NM
MARK #	355	WITHIN	17.07420469	NM
MARK #	358	WITHIN	15.75065082	NM
MARK #	360	WITHIN	1.726522594	NM
MARK #	361	WITHIN	0	NM
MARK #	362	WITHIN	2.934100188	NM
MARK #	363	WITHIN	0.035550629	NM
MARK #	364	WITHIN	1.176788908	NM
MARK #	365	WITHIN	82.92924187	NM

** ***** ***** ***** *****

S T L

ST. LOUIS, MO.



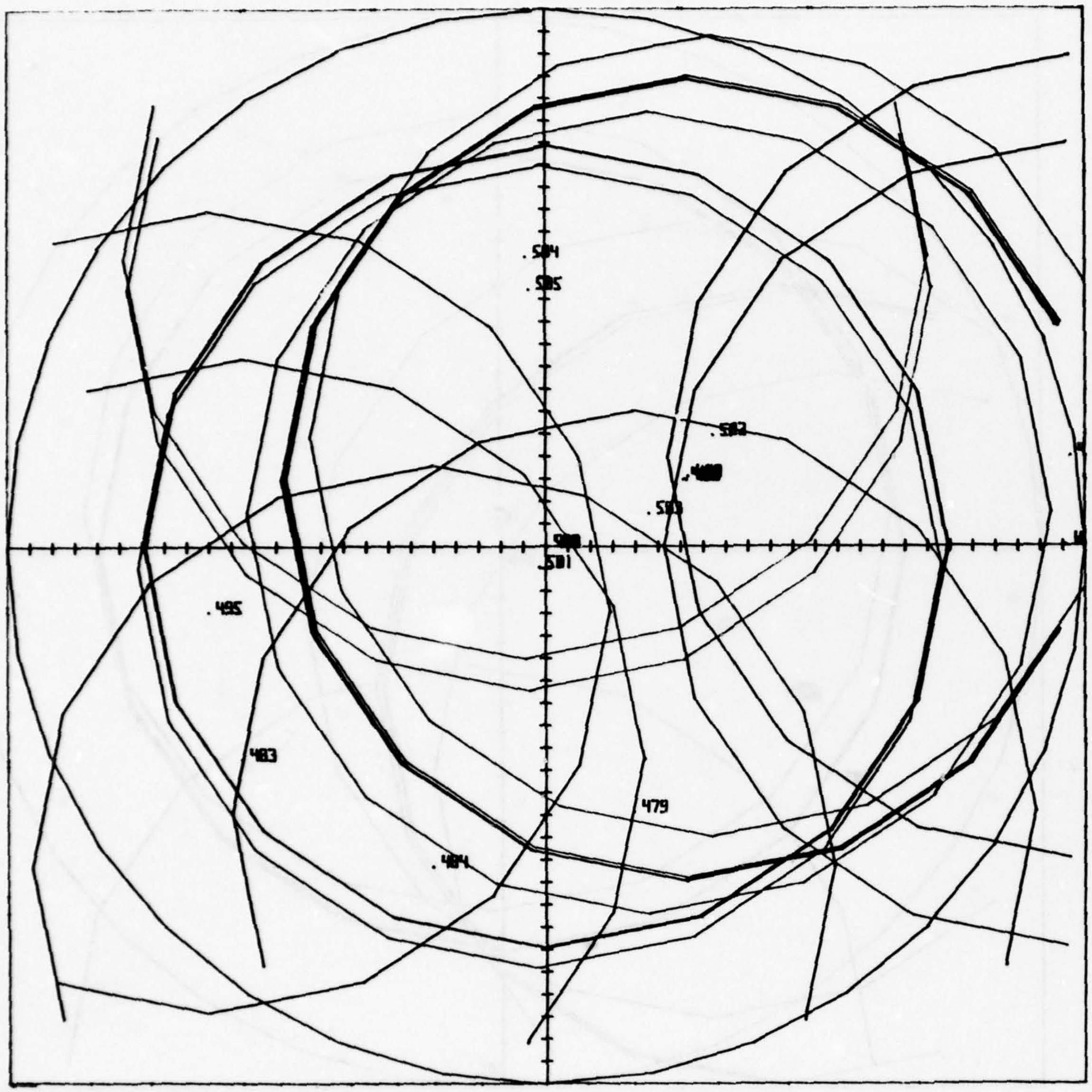
... 1000 GIVES RADIUS 44.72135
... OF AREA (RADIUS (NM)) 60

... # 361 USED AS NOMINAL SITE

RADAR # 228 WITHIN 30.77025784
RADAR # 355 WITHIN 17.07420469
RADAR # 358 WITHIN 15.75505082
RADAR # 360 WITHIN 1.726522594
RADAR # 361 WITHIN 0 NM
RADAR # 362 WITHIN 2.434108188
RADAR # 363 WITHIN 0.03550629
RADAR # 364 WITHIN 1.176708909
*** ***** ***** ***** *****

SYRACUSE, N. Y.

S Y R



HEIGHT 4000 GIVES RADIUS 89.44271910
SIZE OF AREA <RADIUS (NM)> 120

FILE # 500 USED AS NOMINAL SITE

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RADAR # 479	WITHIN	62.45255757	NM
RADAR # 483	WITHIN	82.67314906	NM
RADAR # 484	WITHIN	75.76026686	NM
RADAR # 486	WITHIN	34.71342096	NM
RADAR # 487	WITHIN	34.71342096	NM
RADAR # 488	WITHIN	35.36828756	NM
RADAR # 489	WITHIN	0.384209915	NM
RADAR # 495	WITHIN	76.51755441	NM
RADAR # 496	WITHIN	34.14205608	NM
RADAR # 497	WITHIN	118.3560905	NM
RADAR # 498	WITHIN	118.3560905	NM
RADAR # 500	WITHIN	0	NM
RADAR # 501	WITHIN	4.821459525	NM
RADAR # 502	WITHIN	44.56811083	NM
RADAR # 503	WITHIN	24.20306732	NM
RADAR # 504	WITHIN	64.51521386	NM
RADAR # 505	WITHIN	57.37071176	NM

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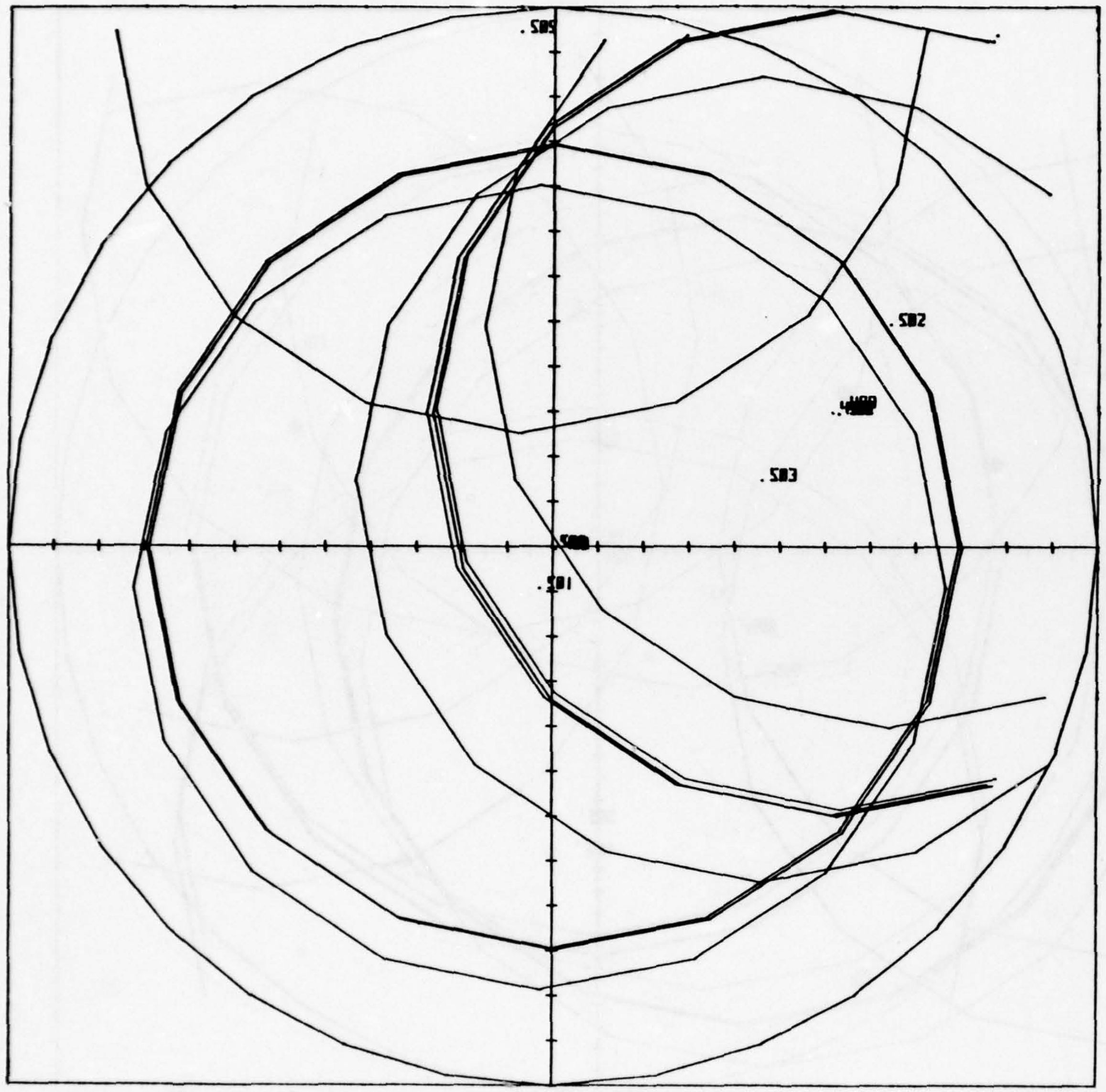
S Y R

SYRACUSE, N. Y.



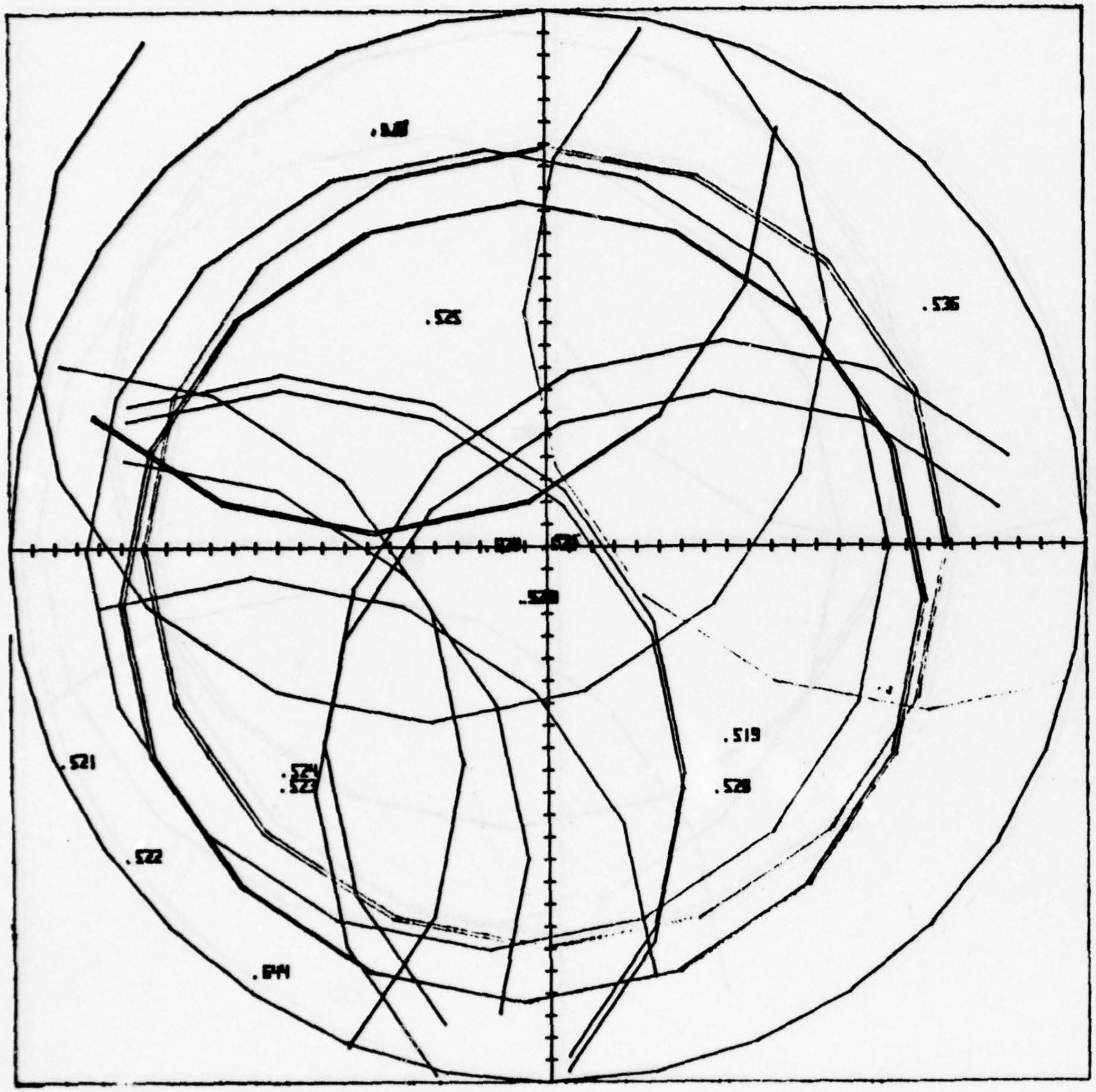
HEIGHT 1000 GIVES RADIUS 44.72135
ZE OF AREA (RADIUS (NM)) 60

I LE # 500 USED AS NOMINAL SITE

RADAR	# 486	WITHIN	34.71342096
RADAR	# 487	WITHIN	34.71342096
RADAR	# 488	WITHIN	35.36828756
RADAR	# 489	WITHIN	0.38420991
RADAR	# 496	WITHIN	34.14205608
RADAR	# 500	WITHIN	0 NM
RADAR	# 501	WITHIN	4.821459525
RADAR	# 502	WITHIN	44.56811083
RADAR	# 503	WITHIN	24.20306732
RADAR	# 505	WITHIN	57.37071176
****	*****	*****	***** *****

T I K

OKLAHOMA CITY, OKL.



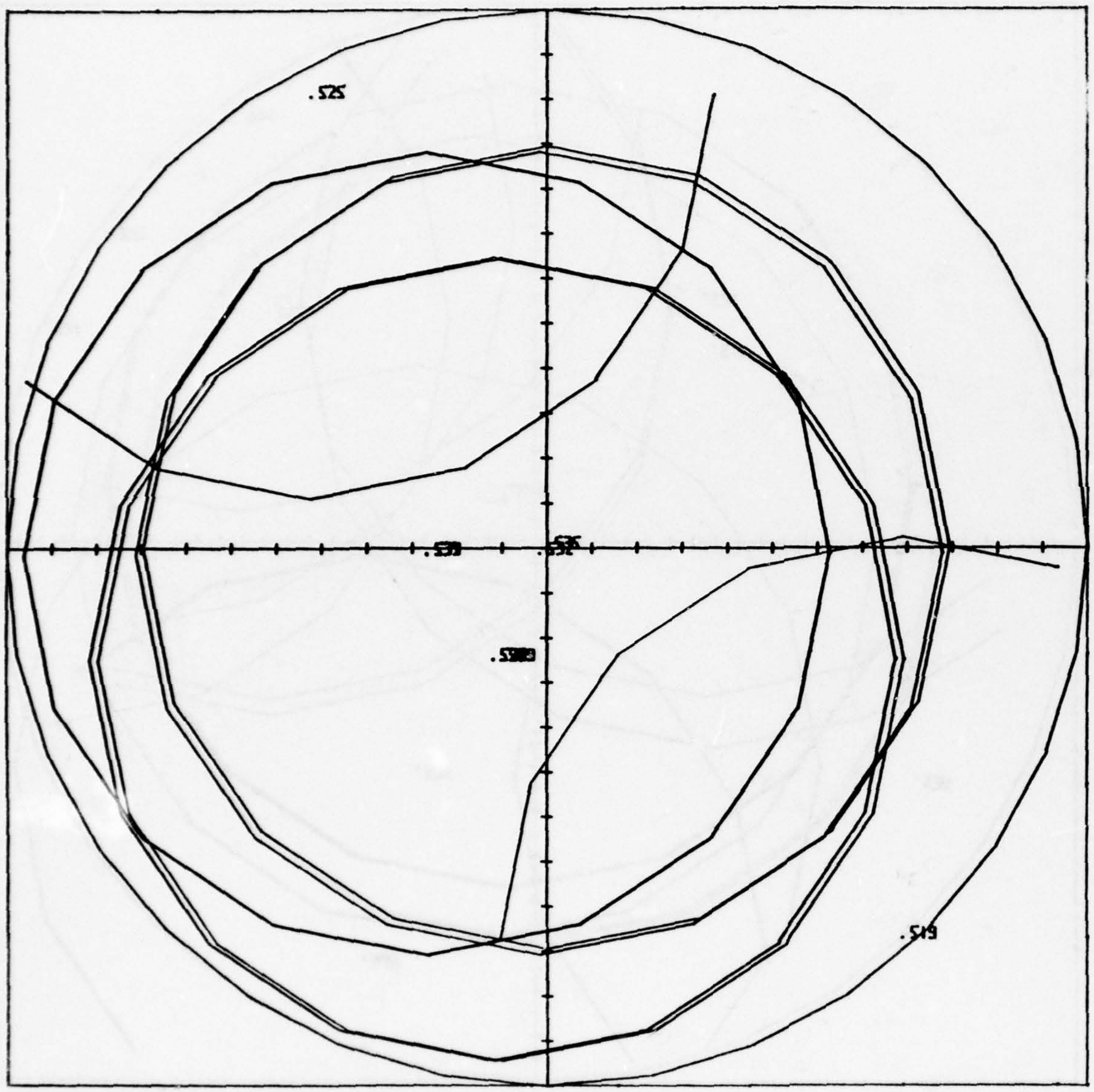
HEIGHT 4000 GIVES RADIUS 89.4427191
SIZE OF AREA <RADIUS (NM)> 120

FILE # 535 USED AS NOMINAL SITE

RADAR #	519	WITHIN	58.82899355	NM
RADAR #	520	WITHIN	66.53099908	NM
RADAR #	521	WITHIN	118.7694847	NM
RADAR #	522	WITHIN	117.2948049	NM
RADAR #	523	WITHIN	80.3992177	NM
RADAR #	524	WITHIN	77.95267929	NM
RADAR #	525	WITHIN	56.64708311	NM
RADAR #	526	WITHIN	99.8183975	NM
RADAR #	527	WITHIN	100.3637278	NM
RADAR #	528	WITHIN	13.8383979	NM
RADAR #	529	WITHIN	13.48493059	NM
RADAR #	530	WITHIN	13.8383979	NM
RADAR #	531	WITHIN	13.36170288	NM
RADAR #	532	WITHIN	1.029542731	NM
RADAR #	533	WITHIN	13.36170288	NM
RADAR #	534	WITHIN	13.38831897	NM
RADAR #	535	WITHIN	0	NM
RADAR #	536	WITHIN	99.62643454	NM
RADAR #	644	WITHIN	116.5874385	NM
*****	*****	*****	*****	*****

T I K

OKLAHOMA CITY, OKL.

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IGHT 1000     GIVES RADIUS 44.7213
ZE OF AREA  RADIUS (NM)  60

LE # 535  USED AS NOMINAL SITE

RADAR # 519  WITHIN 58.82899355
RADAR # 525  WITHIN 56.64708311
RADAR # 528  WITHIN 13.8383974
RADAR # 529  WITHIN 13.48493059
RADAR # 530  WITHIN 13.8383974
RADAR # 531  WITHIN 13.36170208
RADAR # 532  WITHIN 1.02954273
RADAR # 533  WITHIN 13.36170208
RADAR # 534  WITHIN 13.38831897
RADAR # 535  WITHIN 0     NM
***  *****  *****  *****.  *****
```
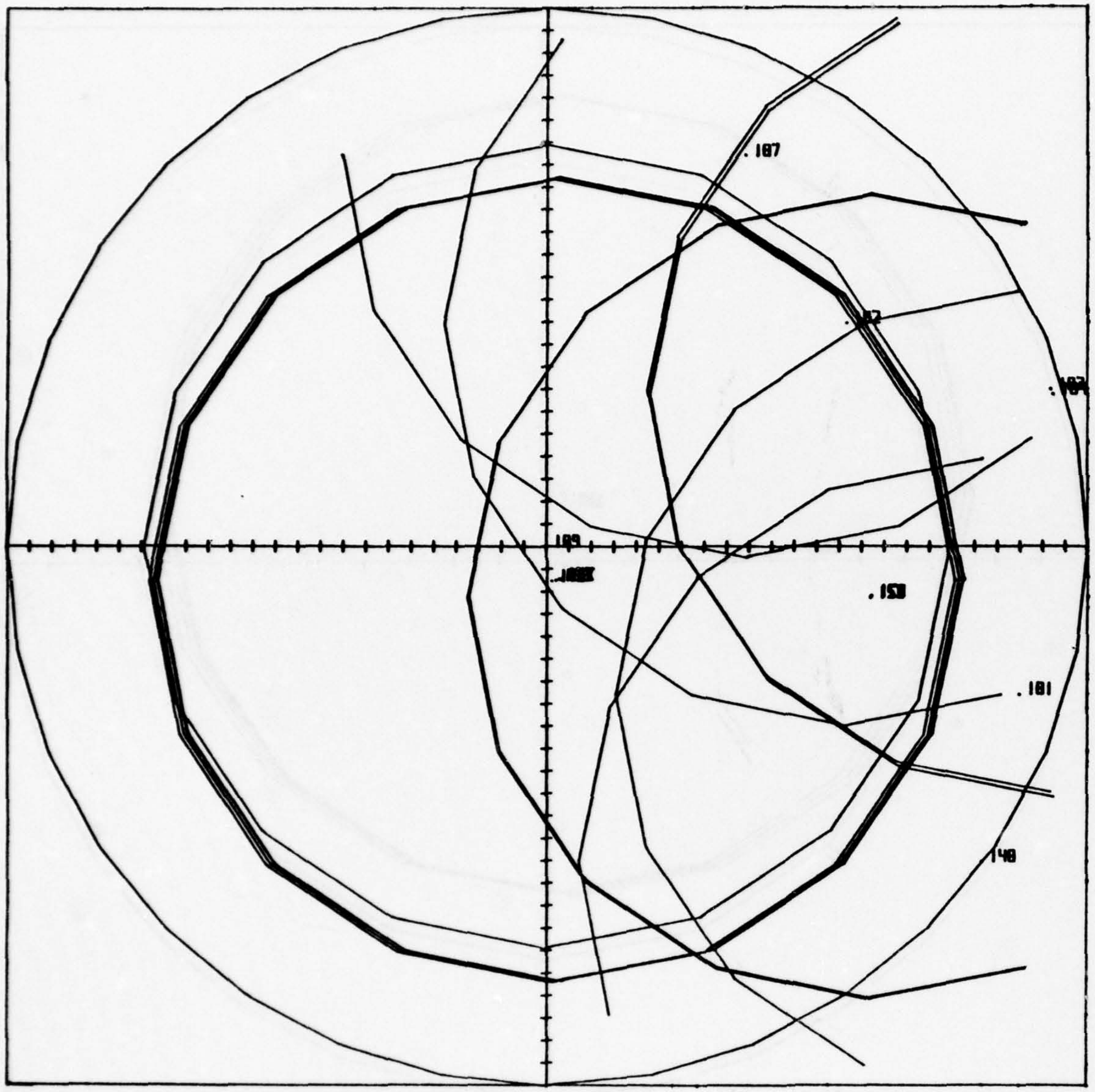

T P A

TAMPA, FLORIDA
McDILL



HGHT 4000   GIVES RADIUS 89.442191
SIZE OF AREA RADIUS (NM) 120

SITE # 189 USED AS NOMINAL SITE

RADAR	# 148	WITHIN	119.4265844	NM
RADAR	# 150	WITHIN	72.99209055	NM
RADAR	# 151	WITHIN	72.99209055	NM
RADAR	# 152	WITHIN	72.7461942б	NM
RADAR	# 175	WITHIN	7.953630939	NM
RADAR	# 176	WITHIN	7.686776208	NM
RADAR	# 177	WITHIN	7.711488828	NM
RADAR	# 181	WITHIN	109.8593083	NM
RADAR	# 182	WITHIN	83.02848774	NM
RADAR	# 183	WITHIN	117.1282424	NM
RADAR	# 184	WITHIN	117.3253818	NM
RADAR	# 187	WITHIN	97.6475881	NM
RADAR	# 188	WITHIN	7.756525563	NM
RADAR	# 189	WITHIN	0	NM

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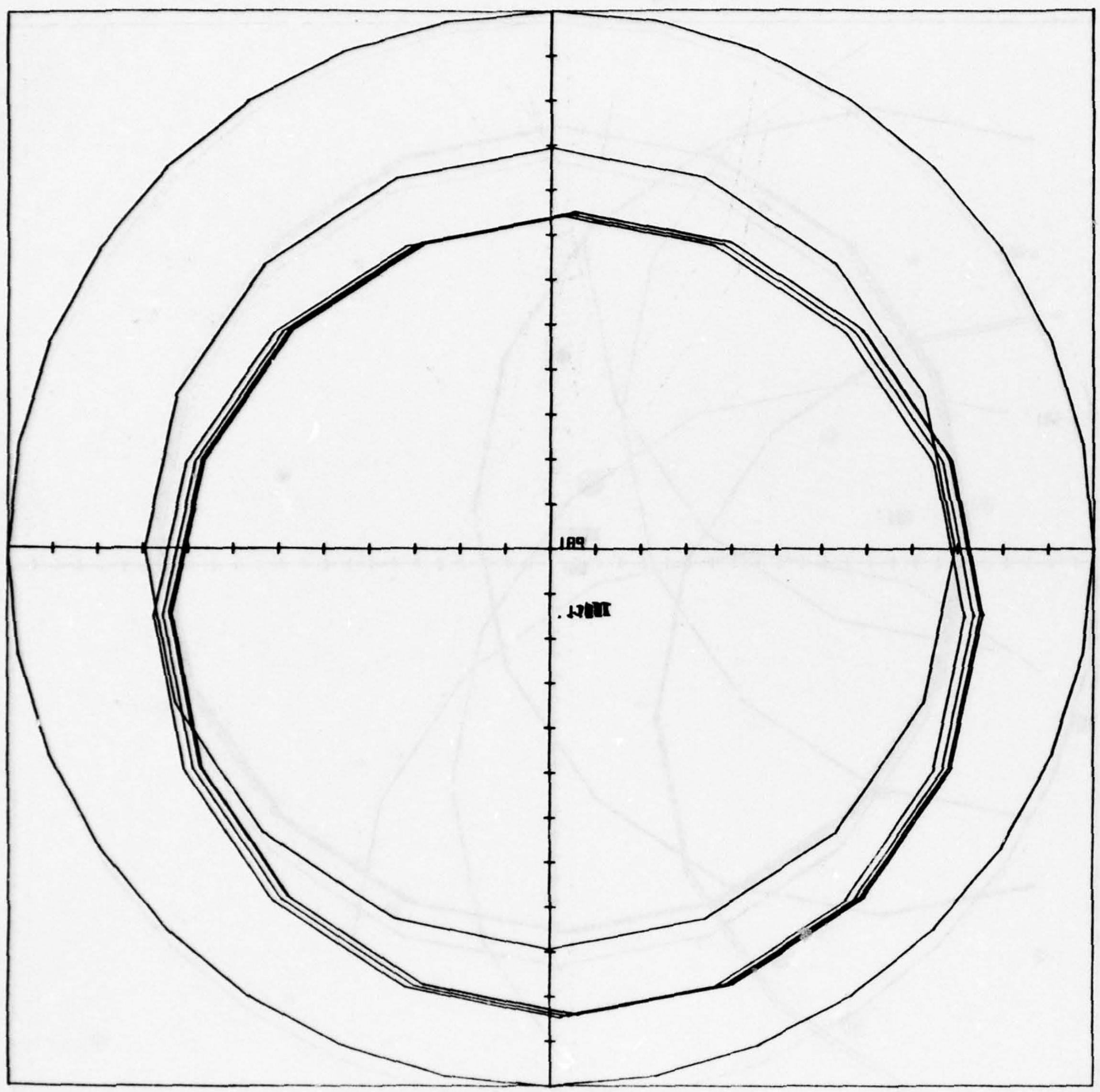


TPA

TAMPA, FLORIDA
McDILL

IGHT 1000 GIVES RADIUS 44.7213
ZE OF AREA RADIUS (NM) 60

LE # 189 USED AS NOMINAL SITE

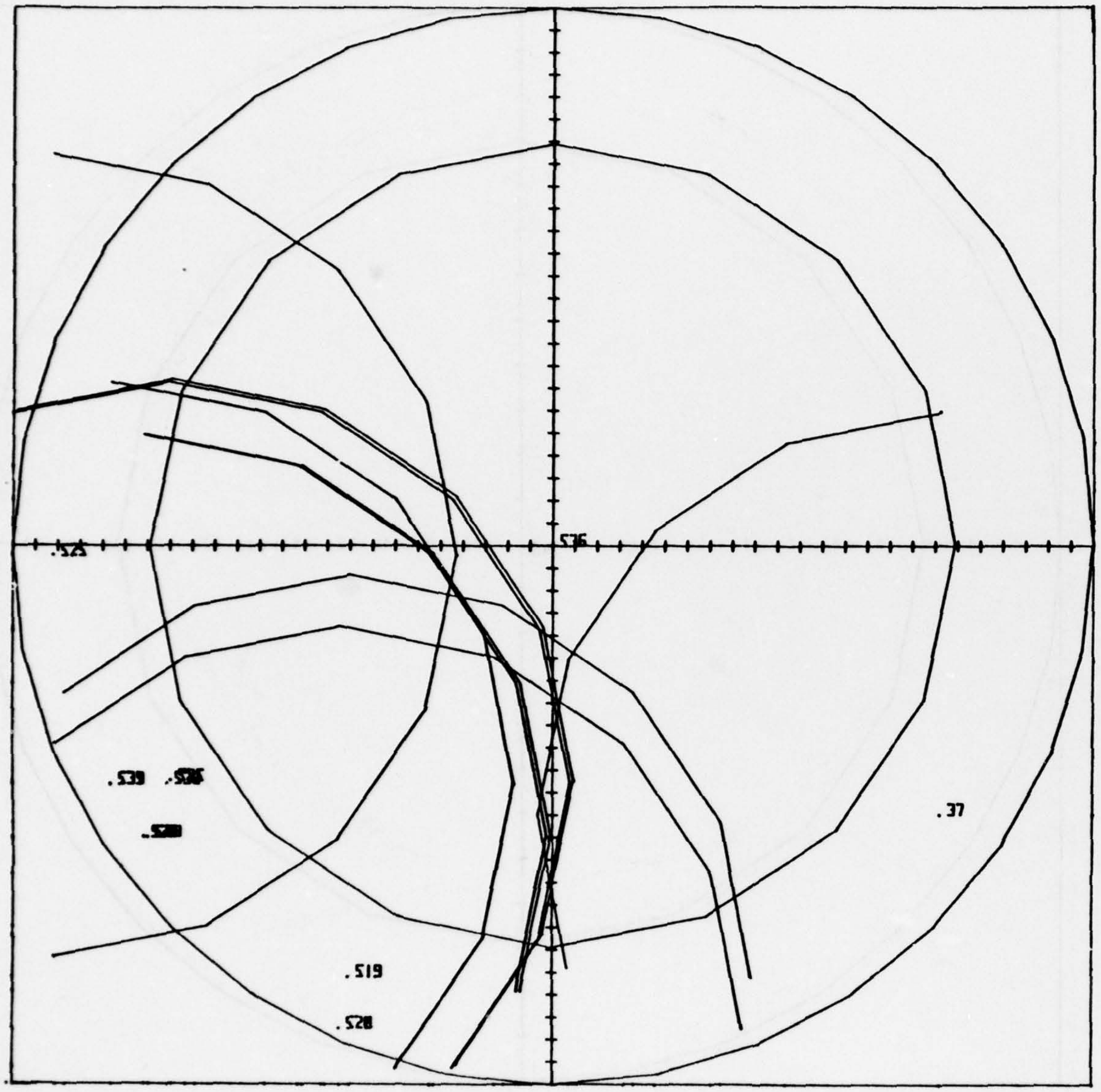
RADAR # 175 WITHIN 7.95363093
RADAR # 176 WITHIN 7.68677628
RADAR # 177 WITHIN 7.11483823
RADAR # 188 WITHIN 7.75053556
RADAR # 189 WITHIN 0 NM

*** ***** ***** ***** *****

D-170

T U L

TULSA, OKLAHOMA



[illegible] 4000 GIVEN RADIUS 89.44271
[illegible] DELTA RADIUS (NM) 1.0

[illegible] # 536 USED AS NOMINAL SITE

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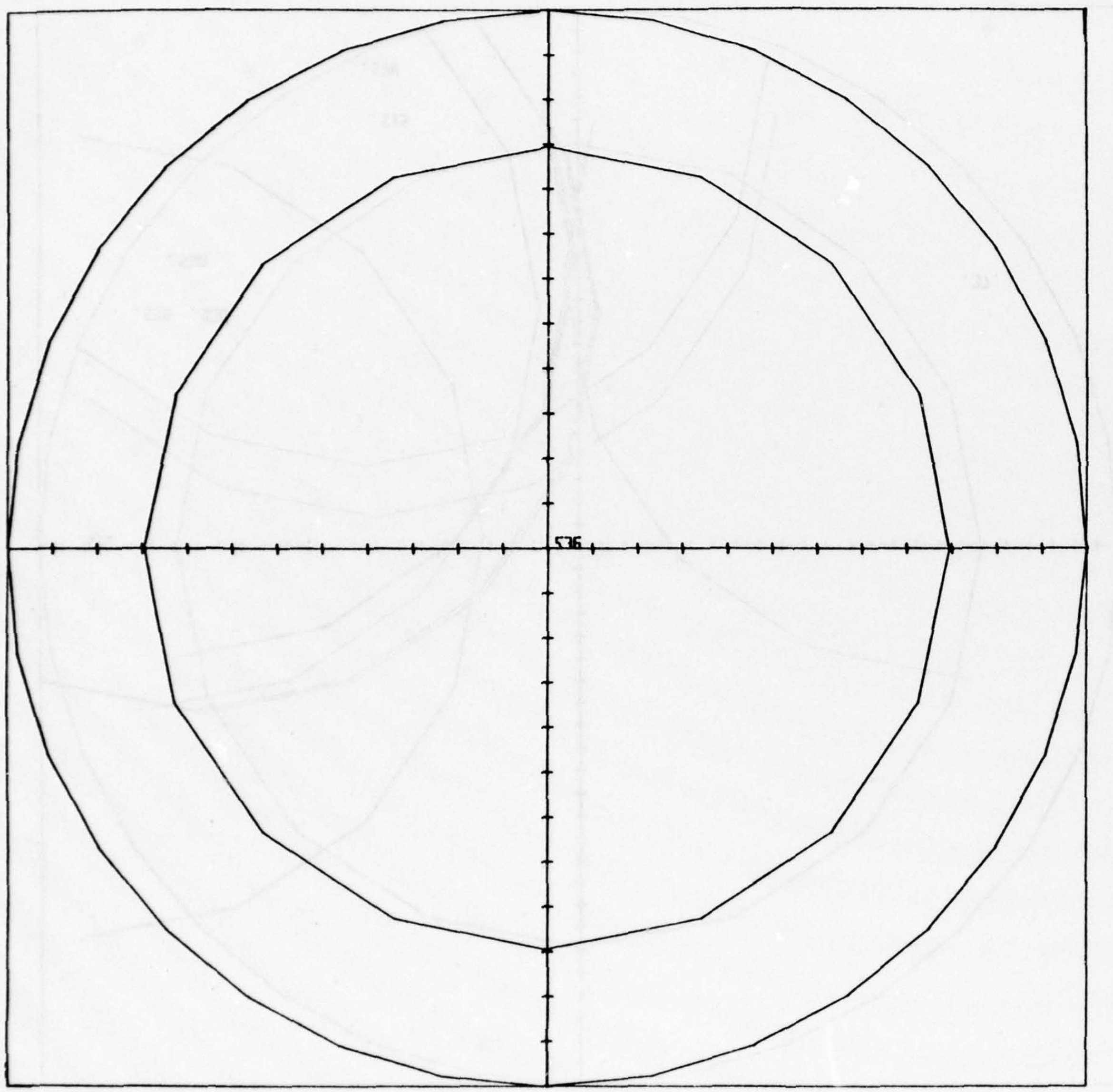
[illegible]	# 520	WITHIN	11[illegible].[illegible]148		NM
[illegible]	# 525	WITHIN	110.[illegible]72		NM
[illegible]	# 528	WITHIN	111.5304127		NM
[illegible]	# 529	WITHIN	110.78[illegible]		NM
[illegible]	# 530	WITHIN	111.5304127		NM
[illegible]	# 531	WITHIN	111.5280914		NM
[illegible]	# 532	WITHIN	100.[illegible]613		NM
[illegible]	# 533	WITHIN	111.5280914		NM
[illegible]	# 534	WITHIN	111.526[illegible]		NM
[illegible]	# 535	WITHIN	9[illegible].[illegible]454		NM
[illegible]	# 536	WITHIN	0	NM	

T U L

TULSA, OKLAHOMA



LGUT 1000   GIVES RADIUS 44.7213
ZE OF AREA (RADIUS (NM) 60

TE # 536 USED AS NOMINAL SITE

RADAR # 536 WITHIN 0 NM
*** ***** ***** ***** *****

APPENDIX E

BCAS ACCURACY ANALYSIS

APPENDIX E

BCAS ACCURACY ANALYSIS

E.1 INTRODUCTION

A universal tool capable of estimating the accuracy of any BCAS mode has been developed. This simulation is based on "covariance analysis" as opposed to "Monte-Carlo analysis" and as such utilizes much less computer time. This simulation was used to perform accuracy analysis on over 100 possible BCAS modes and to investigate both target and radar singularities which occur in certain modes of operation. The results of these analyses were used to assist in the selection of the recommended BCAS concept.

E.2 DESCRIPTION OF THE SIMULATION

The mathematical approach used to develop the simulation tool is based on linearization of the basic equations required to solve for target range and bearing relative to BCAS. The basic equations which need to be solved are given by

$$\tau_1 = \rho_{1T} + \rho_{0T} - \rho_{10} \tag{E-1}$$

$$\rho_{10} = \rho_{1T} \cos\Delta\alpha_1 - \rho_{0T} \cos(\beta-\alpha_{10}) \tag{E-2}$$

$$\rho_{1T} \sin\Delta\alpha_1 = \rho_{0T} \sin(\beta-\alpha_{10}) \tag{E-3}$$

and the geometry for which these equations apply is illustrated in Figure E-1.

Note that these equations are valid only for a two-dimensional analysis, but the results of this two-dimensional analysis have been compared with a complete three-dimensional Monte-Carlo simulation of a specific mode of BCAS. This comparison of the two analytic methods showed equivalence of the approaches. Also note that a covariance analysis of the three-dimensional equations is also possible, but was not done as part of this work due to time limitations. This will be pursued at a later time.

Linearization of equations (E-1), (E-2), and (E-3) results in the following equation set:

$$\begin{bmatrix} -1 & 1 & 0 & 0 & -1 & 1 & 0 \\ -1 & \cos\Delta\alpha_1 & -\rho_{OT}{}^* \sin(\beta-\alpha_{10}) & -\rho_{1T}{}^* \sin\Delta\alpha_1 & 0 & -\cos(\beta-\alpha_{10}) & \rho_{OT}{}^* \sin(\beta-\alpha_{10}) \\ 0 & \sin\Delta\alpha_1 & \rho_{OT}{}^* \cos(\beta-\alpha_{10}) & \rho_{1T}{}^* \cos\Delta\alpha_1 & 0 & -\sin(\beta-\alpha_{10}) & -\rho_{OT}{}^* \cos(\beta-\alpha_{10}) \end{bmatrix} \begin{bmatrix} \delta\rho_{10} \\ \delta\rho_{1T} \\ \delta\alpha_{10} \\ \delta\Delta\alpha_1 \\ \delta\tau_1 \\ \delta\rho_{OT} \\ \delta\beta \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix} \tag{E-4}$$

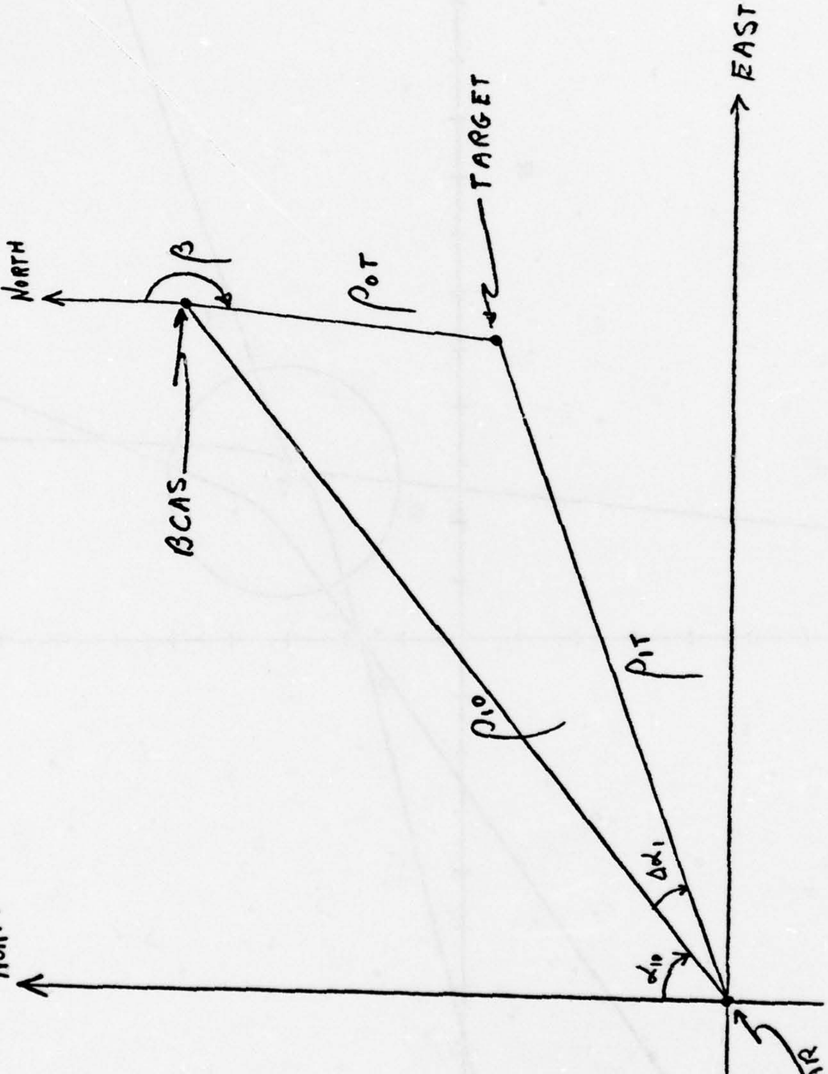
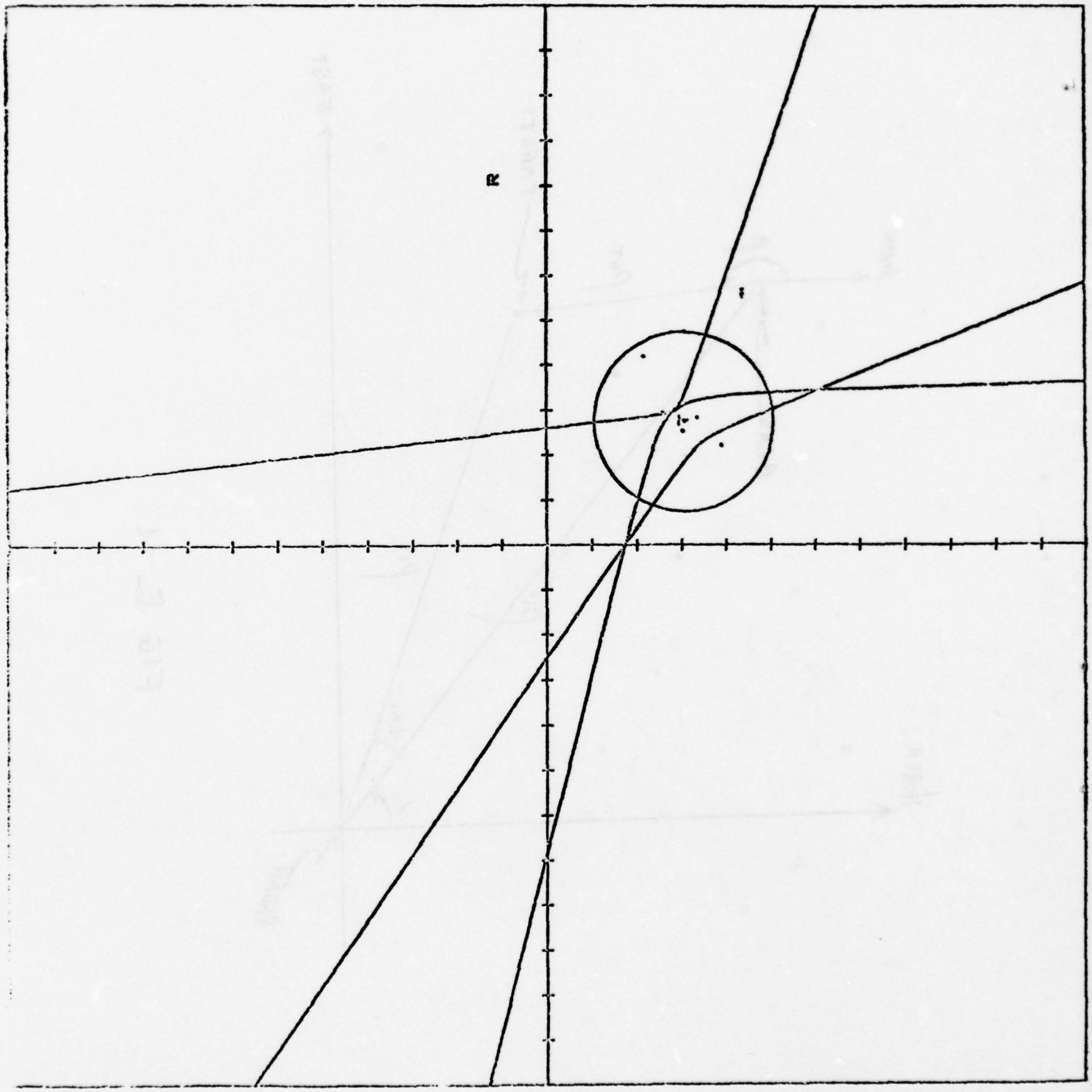

NORTH
NORTH
EAST
TARGET
BCAS
RADAR
β
ρ_{0T}
ρ_{1T}
ρ_{10}
$\Delta\alpha_1$
α_{10}

FIG E-1


R

Equation set (E-4) clearly represents three equations in seven unknowns. Thus, to obtain a deterministic solution, four variables must be specified or measured. An over-determined solution occurs when more than four variables are measured.

The total number of possible modes of BCAS can then be calculated from

$$N = C_4^7 + C_5^7 + C_6^7 + C_7^7 \tag{E-5}$$

so that N = 64.

The simulation program "SINGLE" has the capability of analyzing any of the 64 possible solutions for any radar/BCAS/target geometry. The technique used is to form the appropriate matrix equation from (E-4) in the form

$$A \left\{\delta x\right\} = B \left\{\delta y\right\} \tag{E-6}$$

where $\{\delta x\}$ are the unknown variables and $\{\delta y\}$ are the measured variables. The solution of (E-6) in general is given by

$$\delta x = \left[A^T A\right]^{-1} A^T B \, \delta y \tag{E-7}$$

The covariance matrix of the unknowns is thus related to the covariance matrix of the measurements by

$$P = K\,M\,K^T \tag{E-8}$$

where

$$\left.\begin{aligned} K &= [A^T A]^{-1} A^T B \\ M &= E\,(\delta y\ \delta y^T) \\ P &= E\,(\delta x\ \delta x^T) \end{aligned}\right\} \tag{E-9}$$

Given P, the main diagonal elements are the variances of the unknowns.

As an example, suppose a BCAS mode which measures ρ_{10}, α_{10}, $\Delta\alpha_1$ and τ_1. Under this assumption,

$$\delta y = \begin{pmatrix} \delta\rho_{10} \\ \delta\alpha_{10} \\ \delta\Delta\alpha_1 \\ \delta\tau_1 \end{pmatrix} \quad \text{and} \quad x = \begin{pmatrix} \delta\rho_{1T} \\ \delta\rho_{0T} \\ \delta\beta \end{pmatrix}$$

M is then formed by placing the variance of the measurement on the main diagonal so that

$$M = \begin{bmatrix} \sigma^2_{\rho_{10}} & 0 & 0 & 0 \\ 0 & \sigma^2_{\alpha_{10}} & 0 & 0 \\ 0 & 0 & \sigma^2_{\Delta\alpha_1} & 0 \\ 0 & 0 & 0 & \sigma^2_{\tau_1} \end{bmatrix}$$

K is solved for using specific geometry and then P is calculated using equation (E-8). The position uncertainty is then obtained from

$$\sigma_P = \left\{ \sigma^2_{\rho_{0T}} + \rho^2_{0T}\ \sigma^2_{\beta} \right\}^{\frac{1}{2}} \qquad \text{(E-10)}$$

This technique has been extended to two radars and is documented in program "DUAL." A third program called "DUAL-ATCRBS" has the capability of analyzing two-radar/two-target BCAS modes. Listings of these programs are presented as Attachment 1 of this appendix.

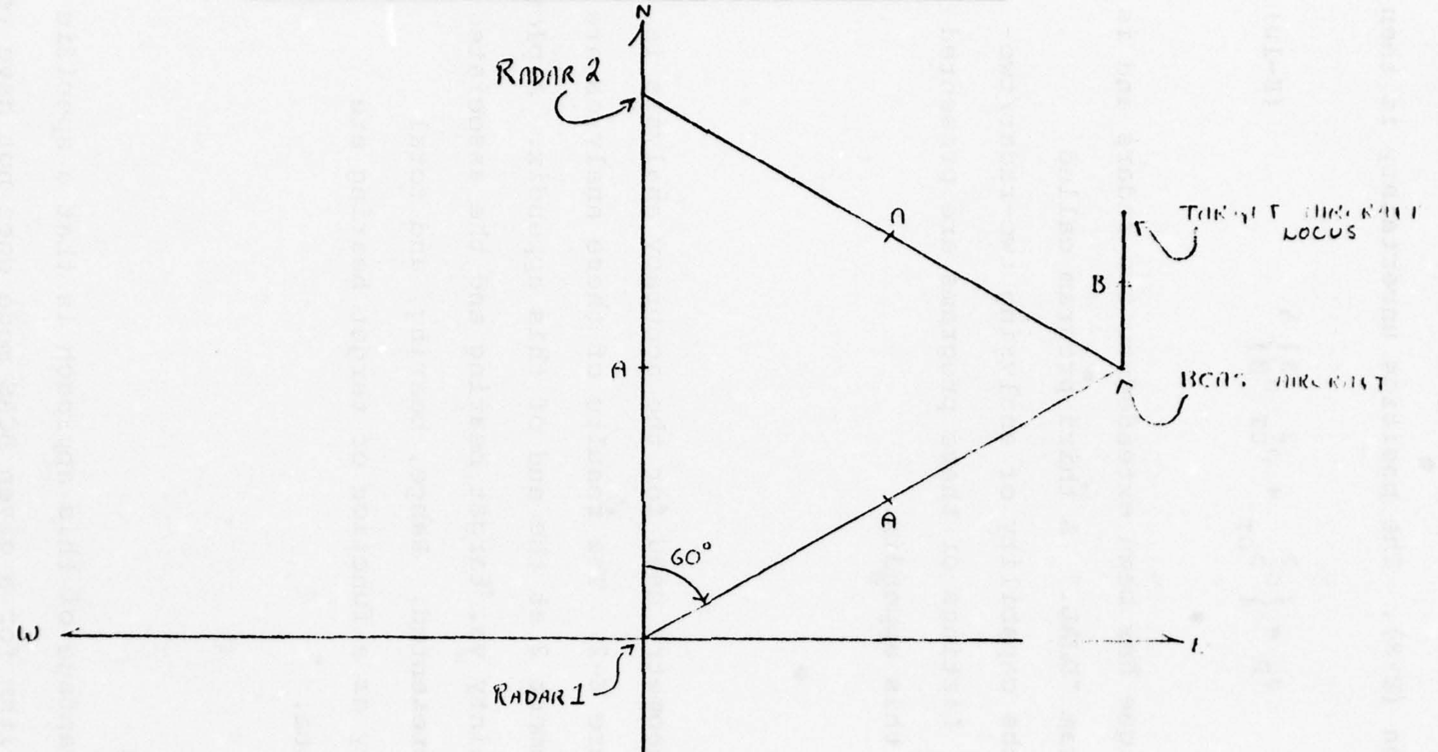
E.3 RESULTS

The basic geometry used for the accuracy analysis is illustrated in Figure E-2. The results of these analyses are presented as Attachment 2 at the end of this appendix. A plot of position uncertainty vs. target bearing and the associated numerical data is presented. Range, bearing, and total position uncertainty as a function of target bearing are contained in the data.

E.4 CONCLUSIONS

A clear advantage of this approach is that a specific computational algorithm for a given BCAS mode does not have to be developed for purposes of accuracy analysis. A Monte-Carlo

FIG E-2 BCAS ANALYSIS GEOMETRY



ANALYSIS RUNS WERE MADE WITH

A(nm)	B(nm)
10	5
20	8
50	10
100	20

THE TARGET AIRCRAFT WOULD THEN ROTATE ABOUT THE BCAS AIRCRAFT

simulation has been developed which has the ability of evaluating a specific BCAS computational algorithm and has been used to check the validity of the covariance analysis. As expected, both results agree to a high degree of accuracy. The listing of the Monte-Carlo simulation is presented as Attachment 3 at the end of this appendix. Although this work is two-dimensional, it is relatively straightforward to extend to three dimensions. It is planned that this work will be done in the near future; it will be used to investigate the possibility of estimating target altitude when the target is equipped only with a Mode A transponder (without an encoding altimeter).

PROGRAM LISTINGS

FOR

SINGLE

DUAL

DUAL-ATCRBS

ATTACHMENT I

SINGLE SITE
COVARIANCE

```
>PIP U

>SET UIC=[120,120]
>PIP DK1:/LI

DIRECTORY DK1:[120,120]
22-MAR-78 08:56

PCOMP.FTN;15          5.     17-MAR-78 09:02
SINGLE.CMD;2          1.     17-MAR-78 09:02
SINGLE.TSK;26        61.   C 17-MAR-78 09:02
VECTOR.FTN;50        10.     17-MAR-78 09:02
DRIVER.FTN;115       23.     17-MAR-78 09:02
LIBR.FTN;24           6.     17-MAR-78 09:02
LIBR.OBJ;7           16.     17-MAR-78 09:02
VECTOR.OBJ;6         23.     17-MAR-78 09:02
DRIVER.OBJ;36        35.     17-MAR-78 09:02
PCOMP.OBJ;11         11.     17-MAR-78 09:02

     TOTAL OF 191. BLOCKS IN 10. FILES


>PI TI:=DK1:SINGLE.CMD
MCR -- ILLEGAL FUNCTION
>PIP TI:=DK1:SINGLE.CMD
DK1:SINGLE=DK1:DRIVER,DK1:PCOMP,DK1:LIBR,DK1:VECTOR
/
LIBR=FORRES:RO
//
>
```

```
>PIP TI:=DK1:DRIVER.FTN
C----- ----- ----- ----- ----- ----- ----- ----- ----- -----
C
C       .....DRIVER FOR BCAS STUDIES
C
C       LAST AMENDED:  FEB 23/78
C       PROGRAMMED BY:  DEL WEATHERS AND ED KOENKE
C
C          THIS DRIVER MAKES USE OF VECTOR NOTATION
C       FOR POSITION REPRESENTATION. THERE ARE TWO RADARS;
C       <1> AT 0,0 OF THE FRAMEWORK AND <2>'S POSITION
C       IS READ IN.  THERE ARE TWO AIRCRAFT. BOTH OF THEIR
C       RELATIVE POSITIONS ARE READ IN AS INPUTS.
C
C       CONVENTIONS:
C
C       VARIABLES CONTAINING A 'V' ARE USUALLY 3 ELEMENT VECTORS
C       VARIABLES CONTAINING 'RHO' ARE DISTANCES (NM)
C       VARIABLES CONTAINING 'ALF' ARE ANGLES (USUALLY RADIANS)
C       VARIABLES CONTAINING '1' REFER TO RADAR <1>
C       VARIABLES CONTAINING '2' REFER TO RADAR <2>
C       VARIABLES CONTAINING '0' REFER TO <OWN> AIRCRAFT
C       VARIABLES CONTAINING 'T' REFER TO <TARGET> AIRCRAFT
C       VARIABLES STARTING WITH 'D' HAVE BEEN DIRTIED (EXCEPT DTOA)
C       VARIABLES ENDING WITH 'C' ARE IN DEGREES
C       VARIABLES ENDING WITH 'S' ARE ONE SIGMA ERRORS
C
C       FOR EXAMPLE:
C           RHO10 IS THE DISTANCE IN NM FROM RADAR <1> TO
C                 <OWN> AIRCRAFT
C           DRHO10 IS THE DIRTY DISTANCE OF THE ABOVE EXAMPLE
C           DDTOA1 IS THE DIRTY DIFF TIME-OF-ARRIVAL WITH RADAR <1>
C
C----- ----- ----- ----- ----- ----- ----- ----- ----- -----
        DIMENSION K(7),L(7),IBLANK(20)
        DOUBLE PRECISION ERRMAT(100,4),ERRRED(100,4)
        DOUBLE PRECISION TEMP1(6,6),TEMP2(6,6),TEMP3(6,6),TEMP4(6,6)
        DOUBLE PRECISION TEMP5(6,6),TEMP6(6,6),TEMP7(6,6)
        DOUBLE PRECISION RHOV12(3),RHOV10(3),RHOV0T(3),UNITX(3)
        DOUBLE PRECISION RHOV1T(3),RHOV20(3),RHOV2T(3),A(6,6),B(6,6)
        DOUBLE PRECISION DV1T(3),EV1T(3),TEMPV(3),S(7),T(7),P(6,6)
        DOUBLE PRECISION DV20(3),EV20(3),DV10(3),EV10(3),SIG(6,6)
        DOUBLE PRECISION DV2T(3),EV2T(3)
        DOUBLE PRECISION DV12(3),EV12(3),EOV12(3)
        DOUBLE PRECISION EV020(3),EV010(3),EV02T(3),EV01T(3)
        DOUBLE PRECISION ALF12,RHO12,H2,ALF12C,G,CEP,CEPV(100)
        DOUBLE PRECISION ALF10,RHO10,H0,ALF10C
        DOUBLE PRECISION BETA,RHO0T,HT,BETAX
        DOUBLE PRECISION RHO1T,SALF1T,TEMP,CALF1T
        DOUBLE PRECISION ALF1T,ALF1TC,RHO20,SALF20
        DOUBLE PRECISION CALF20,ALF20,ALF20C,RHO2T
        DOUBLE PRECISION SALF2T,CALF2T,ALF2T,ALF2TC
        DOUBLE PRECISION SALFD1,CALFD1,ALFD1,ALFD1C
        DOUBLE PRECISION SALFD2,CALFD2,ALFD2,ALFD2C
        DOUBLE PRECISION BETD1,BETD1C,SBETD1,CBETD1
        DOUBLE PRECISION BETD2,BETD2C,SBETD2,CBETD2
        DOUBLE PRECISION DTOA1,DTOA2,CONVDR,CONVNM
        DOUBLE PRECISION SGAM0,CGAM0,GAM0,GAM0C
        DOUBLE PRECISION SGAMT,CGAMT,GAMT,GAMTC,COL(3,7),AVER,SDEV
C
        DATA CONVDR/57.2957795131D0/    !DEG --> RAD CONV FACTOR
        DATA CONVNM/6076.115D0/         !NM CONVERSION
        DATA UNITX/1.0D0,0.0D0,0.0D0/   !UNIT VECTOR ON X
```

```
C
        CALL INPUT(K,L,S,MIN,MAX)
C
C----- INPUT RADAR <2> POSITION RELATIVE TO RADAR <1>
C
200     WRITE(5,100)
        WRITE(5,101)
        READ(5,102)RHO12,ALF12C,H2
            IF(H2 .NE. 0.0)H2=H2/CONVNM
            ALF12=ALF12C/CONVDR
            RHOV12(1)=DSQRT(RHO12**2-H2**2)*DCOS(ALF12)
            RHOV12(2)=DSQRT(RHO12**2-H2**2)*DSIN(ALF12)
            RHOV12(3)=-H2
            WRITE(5,300)RHOV12
C
C----- INPUT <OWN> POSITION RELATIVE TO RADAR <1>
C
        WRITE(5,110)
        WRITE(5,111)
        READ(5,102)RHO10,ALF10C,H0
            IF(H0 .NE. 0.0)H0=H0/CONVNM
            ALF10=ALF10C/CONVDR
            RHOV10(1)=DSQRT(RHO10**2-H0**2)*DCOS(ALF10)
            RHOV10(2)=DSQRT(RHO10**2-H0**2)*DSIN(ALF10)
            RHOV10(3)=-H0
            WRITE(5,301)RHOV10
C
C----- INPUT <TARGET> POSITION RELATIVE TO <OWN>
C
        WRITE(5,120)
        WRITE(5,112)
        READ(5,142)RHO0T,HT
            IF(HT .NE. 0.0)HT=HT/CONVNM
C
C----- ----- BETA LOOP (EVERY <INPUT> DEGREES) -----
C
            WRITE(5,780)
            READ(5,781)ISTART,INCREM
            WRITE(5,793)
            NUMBER=1

        DO 999 II = ISTART,360,INCREM
C
            BETA=DBLE(FLOAT(II))
            BETAX=BETA/CONVDR
            IX=0
            IY=0
C
C
            RHOV0T(1)=DSQRT(RHO0T**2-HT**2)*DCOS(BETAX)
            RHOV0T(2)=DSQRT(RHO0T**2-HT**2)*DSIN(BETAX)
            RHOV0T(3)=-HT
C
C----- COMPUTE <TARGET> POSITION RELATIVE TO RADAR <1>
C
            CALL ADD(RHOV10,RHOV0T,RHOV1T)
C
C----- COMPUTE RANGE OF <TARGET> TO RADAR <1>
C
            CALL DOT(RHOV1T,RHOV1T,RHO1T)
            RHO1T=DSQRT(RHO1T)
C
C----- COMPUTE AZIMUTH OF <TARGET> RELATIVE TO RADAR <1>
C
```

```
      CALL LATERL(RHOV1T,DV1T)
      CALL UNIT(DV1T,EV1T)
      CALL CROSS(UNITX,EV1T,TEMPV)
      SALF1T=TEMPV(3)                   !SIN OF ALPHA 1T
      CALL DOT(UNITX,EV1T,TEMP)
      CALF1T=TEMP                       !COS OF ALPHA 1T
      ALF1T=DATAN2(SALF1T,CALF1T)
      ALF1TC=ALF1T*CONVDR               !CONVERT TO DEGREES
C
C----- COMPUTE POSITION OF <OWN> RELATIVE TO RADAR <2>
C
      CALL SUB(RHOV10,RHOV12,RHOV20)
C
C----- COMPUTE RANGE OF <OWN> TO RADAR <2>
C
      CALL DOT(RHOV20,RHOV20,RHO20)
      RHO20=DSQRT(RHO20)
C
C----- COMPUTE AZIMUTH OF <OWN> TO RADAR <2>
C
      CALL LATERL(RHOV20,DV20)
      CALL UNIT(DV20,EV20)
      CALL CROSS(UNITX,EV20,TEMPV)
      SALF20=TEMPV(3)                   !SIN OF ALPHA 20
      CALL DOT(UNITX,EV20,TEMP)
      CALF20=TEMP                       !COS OF ALPHA 20
      ALF20=DATAN2(SALF20,CALF20)
      ALF20C=ALF20*CONVDR               !CONVERT TO DEGREES
C
C----- COMPUTE POSITION OF <TARGET> RELATIVE TO RADAR <2>
C
      CALL ADD(RHOV20,RHOV0T,RHOV2T)
C
C----- COMPUTE RANGE OF <TARGET> TO RADAR <2>
C
      CALL DOT(RHOV2T,RHOV2T,RHO2T)
      RHO2T=DSQRT(RHO2T)
C
C----- COMPUTE AZIMUTH OF <TARGET> TO RADAR <2>
C
      CALL LATERL(RHOV2T,DV2T)
      CALL UNIT(DV2T,EV2T)
      CALL CROSS(UNITX,EV2T,TEMPV)
      SALF2T=TEMPV(3)                   !SIN OF ALPHA 2T
      CALL DOT(UNITX,EV2T,TEMP)
      CALF2T=TEMP                       !COS OF ALPHA 2T
      ALF2T=DATAN2(SALF2T,CALF2T)
C
C----- ----- ----- ----- ----- ----- -----
C----- COMPUTE DIFFERENTIAL AZIMUTHS -----
C----- ----- ----- ----- ----- ----- -----
C
      CALL LATERL(RHOV10,DV10)
      CALL UNIT(DV10,EV10)
      CALL CROSS(EV10,EV1T,TEMPV)
      SALFD1=TEMPV(3)                   !SIN OF DIFF ALPHA 1
      CALL DOT(EV10,EV1T,TEMP)
      CALFD1=TEMP                       !COS OF DIFF ALPHA 1
      ALFD1=DATAN2(SALFD1,CALFD1)
C
C
      CALL CROSS(EV20,EV2T,TEMPV)
      SALFD2=TEMPV(3)                   !SIN OF DIFF ALPHA 1
      CALL DOT(EV20,EV2T,TEMP)
      CALFD2=TEMP                       !COS OF DIFF ALPHA 2
      ALFD2=DATAN2(SALFD2,CALFD2)
C
C----- ----- ----- ----- ----- ----- ----- -----
C----- COMPUTE DIFFERENTIAL TIME OF ARRIVAL ----
C----- ----- ----- ----- ----- ----- ----- -----
C
      DTOA1=RHO1T+RHO0T-RHO10
      DTOA2=RHO2T+RHO0T-RHO20
C
C----- COMPUTE DIFFERENTIAL BETA1 AND BETA2 ANGLES -----
C
      CALL LATERL(RHOV12,DV12)
      CALL UNIT(DV12,EV12)
      CALL CROSS(EV10,EV12,TEMPV)
      SBETD1=TEMPV(3)                   !SIN OF DIFF BETA 1
      CALL DOT(EV10,EV12,TEMP)
      CBETD1=TEMP                       !COS OF DIFF BETA 1
      BETD1=DATAN2(SBETD1,CBETD1)
C
C
      Q=-1.0D0
      CALL MULT(EV12,Q,EOV12)
      CALL CROSS(EOV12,EV20,TEMPV)
      SBETD2=TEMPV(3)                   !SIN OF DIFF BETA 2
      CALL DOT(EOV12,EV20,TEMP)
      CBETD2=TEMP                       !COS OF DIFF BETA 2
      BETD2=DATAN2(SBETD2,CBETD2)
C----- ----- ----- ----- ----- ----- ----- ----- -----
C----- COMPUTE GAMMA <OWN> AND GAMMA <TARGET> -----
C----- ----- ----- ----- ----- ----- ----- ----- -----
      CALL MULT(EV10,Q,EV010)
      CALL MULT(EV20,Q,EV020)
      CALL CROSS(EV020,EV010,TEMPV)
      SGAM0=TEMPV(3)                    !SIN OF GAMMA <OWN>
      CALL DOT(EV020,EV010,TEMP)
      CGAM0=TEMP                        !COS OF GAMMA <OWN>
      GAM0=DATAN2(SGAM0,CGAM0)
C
C
      CALL MULT(EV2T,Q,EV02T)
      CALL MULT(EV1T,Q,EV01T)
      CALL CROSS(EV02T,EV01T,TEMPV)
      SGAMT=TEMPV(3)
      CALL DOT(EV02T,EV01T,TEMP)
      CGAMT=TEMP                        !COS GAMMA <TARGET>
      GAMT=DATAN2(SGAMT,CGAMT)
C..... ..... ..... ..... ..... ..... ..... .....
C
C.....COLUMN #1.....
C
     COL(1,1)=-1.0D0
     COL(2,1)=-1.0D0
     COL(3,1)= 0.0D0
C
C.....COLUMN #2.....
     COL(1,2)= 1.0D0
     COL(2,2)= DCOS(ALFD1)
     COL(3,2)= DSIN(ALFD1)
C
C.....COLUMN #3.....
     COL(1,3)= 0.0D0
     COL(2,3)= -RHO0T*DSIN(BETAX-ALF10)
     COL(3,3)= RHO0T*DCOS(BETAX-ALF10)
```

```
C
C-----COLUMN #4-----
      COL(1,4)= 0.0D0
      COL(2,4)= -RHO1T*DSIN(ALFD1)
      COL(3,4)= RHO1T*DCOS(ALFD1)
C
C-----COLUMN #5-----
      COL(1,5)=-1.0D0
      COL(2,5)= 0.0D0
      COL(3,5)= 0.0D0
C
C-----COLUMN #6-----
      COL(1,6)= 1.0D0
      COL(2,6)=-DCOS(BETAX-ALF10)
      COL(3,6)=-DSIN(BETAX-ALF10)
C
C-----COLUMN #7-----
      COL(1,7)= 0.0D0
      COL(2,7)= RHO0T*DSIN(BETAX-ALF10)
      COL(3,7)=-RHO0T*DCOS(BETAX-ALF10)
C
      DO 555 I=1,3
         DO 555 J=1,MAX
            B(I,J)=COL(I,K(J))
555   CONTINUE
C
      DO 556 I=1,3
         DO 556 J=1,MIN
            A(I,J)=-COL(I,K(J+MAX))
556   CONTINUE
C
      DO 557 I=1,MAX
         SIG(I,I)=S(K(I))*S(K(I))
557   CONTINUE
C
      CALL PCOMP(A,B,SIG,P,MIN,MAX,ID,
     +           TEMP1,TEMP2,TEMP3,TEMP4,TEMP5,TEMP6,TEMP7)
C
      IF(ID  .EQ.  1)GOTO 554
C
      DO 550 KK=1,MIN
         P(KK,KK)=10.0D12
550   CONTINUE
554   J=1
      DO 558 I=1,7
         IF(L(I)  .NE.  0)GOTO 558
         S(I)=DSQRT(P(J,J))
         J=J+1
558   CONTINUE
C
      DO 559 I=1,7
         IF(I .EQ. 1 .OR. I.EQ.2 .OR. I.EQ.5 .OR. I.EQ.6)GOTO 561
         T(I)=S(I)*CONVDR
            GOTO 559
561      T(I)=S(I)*CONVNM
559   CONTINUE
C
      J=1
      DO 560 I=1,7
         IF(L(I)  .NE.  0)GOTO 560
         ERRMAT(NUMBER,J)=T(I)
         J=J+1
560   CONTINUE
      CEP=DSQRT(S(6)*S(6)+RHO0T*RHO0T*S(7)*S(7))
      CEP=CEP*CONVNM
      ERRMAT(NUMBER,MIN+1)=CEP
      WRITE(5,792)II,T(6),T(7),CEP
C
      CEPV(NUMBER)=CEP
      NUMBER=NUMBER+1
C
999   CONTINUE
C
      NUMBER=NUMBER-2
      NUMCAN=0
C
581   WRITE(5,716)
      READ(5,791)IPRINT
      IF(IPRINT  .EQ.  1)GOTO 574
C
      WRITE(5,710)
      READ(5,791)ICHAN
      IF(ICHAN  .EQ.  2)GOTO 576
      WRITE(5,712)
      READ(5,791)NUMCAN
C
      DO 568 II=1,NUMCAN
         WRITE(5,714)II
         READ(5,791)IBLANK(II)
568   CONTINUE
C
      J=1
      I=1
565   IF(IBLANK(J)  .NE.  I)GOTO 567
         J=J+1
         IF(J  .GT.  NUMCAN)GOTO 569
         I=I+1
         GOTO 565
567   DO 571 KK=1,MIN+1
         ERRMAT(I-J+1,KK)=ERRMAT(I,KK)
571   CONTINUE
         I=I+1
         GOTO 565
569   CONTINUE
      DO 572 II=I+1,NUMBER
         DO 572 KK=1,MIN+1
            ERRMAT(II-J+1,KK)=ERRMAT(II,KK)
572         CONTINUE
C
      WRITE(5,716)
      READ (5,791)ICHAN
      IF(ICHAN  .EQ.  2)GOTO 576
574   DO 563 II=1,NUMBER-NUMCAN
         IF(MIN  .EQ.  3)WRITE(5,723)II,(ERRMAT(II,J),J=1,MIN+1)

         IF(MIN  .EQ.  2)WRITE(5,722)II,(ERRMAT(II,J),J=1,MIN+1)

         IF(MIN  .EQ.  1)WRITE(5,721)II.(ERRMAT(II,J),J=1,MIN+1)

563   CONTINUE
      IF(IPRINT  .EQ.  1)GOTO 581
576   NUMBER=NUMBER-NUMCAN
      DO 578 II=1,MIN+1
         CALL STAT1(ERRMAT,II,NUMBER,AVER,SDEV)
         WRITE(5,744)II,AVER,SDEV
578   CONTINUE
C----- ----- ----- ----- ----- ----- ----- ----- ----- ----- -----
-----
```

```
100     FORMAT('  INPUT RADAR (2) POSITION RELATIVE TO RADAR (1)')
101     FORMAT(1H$,'  DISTANCE(NM), BEARING(DEG) AND HEIGHT(FT) -->')
102     FORMAT(3F10.3)
103     FORMAT(F10.3)
110     FORMAT('  INPUT (OWN) POSITION RELATIVE TO RADAR (1)')
111     FORMAT(1H$,'  DISTANCE(NM), BEARING(DEG) AND ALTITUDE(FT) -->')
112     FORMAT(1H$,'  DISTANCE(NM) AND ALTITUDE(FT) -->')
120     FORMAT('  INPUT (TARGET) POSITION RELATIVE TO (OWN)')
142     FORMAT(2F10.4)
300     FORMAT('  VECTOR RHOV12 -->  ',3F10.3,/)
301     FORMAT('  VECTOR RHOV10 -->  ',3F10.3,/)
710     FORMAT(1H$,'  ANY CHANGES (Y=1/N=2)-->')
712     FORMAT(1H$,'  HOW MANY CHANGES -->')
714     FORMAT(1H$,I5,' CHANGE ROW ?  ')
716     FORMAT(1H$,'  WANT TO SEE ERRMAT (Y=1/2=N)-->')
721     FORMAT('  ',I4,'  ',2F12.4)
722     FORMAT('  ',I4,'  ',3F12.4)
723     FORMAT('  ',I4,'  ',4F12.4)
744     FORMAT(//'  NUMBER,AVER,SD -->',I10,'  ',2F12.4)
780     FORMAT(1H$,'  BETA START, INCREMENT (DEG) -->')
781     FORMAT(2I4)
791     FORMAT(I4)
792     FORMAT(I4,3F12.4)
793     FORMAT(/,'  BETA        RANGE       BEARING       CEP')
        STOP' --END OF BCAS PROGRAM--'
        END
>
```

```
>PIP TI:=DK1:PCOMP.FTN
C
C-----CALCULATE P MATRIX-----
C
      SUBROUTINE PCOMP(A,B,SIG,P,MIN,MAX,ID,
     +      TEMP1,TEMP2,TEMP3,TEMP4,TEMP5,TEMP6,TEMP7)
      DOUBLE PRECISION A(6,6),B(6,6),SIG(6,6),P(6,6)
      DOUBLE PRECISION TEMP1(6,6),TEMP2(6,6),TEMP3(6,6)
      DOUBLE PRECISION TEMP4(6,6),TEMP5(6,6),TEMP6(6,6)
      DOUBLE PRECISION TEMP7(6,6),TEMP8(6,1)
C
      CALL TRANS  (A,TEMP1,3,MIN)
      CALL MATMUL (TEMP1,A,TEMP2,MIN,3,MIN)
      CALL MATINV (TEMP2,MIN,TEMP8,0,ID)
      CALL MATMUL (TEMP2,TEMP1,TEMP4,MIN,MIN,3)
      CALL MATMUL (TEMP4,B,TEMP5,MIN,3,MAX)
      CALL TRANS  (TEMP5,TEMP6,MIN,MAX)
      CALL MATMUL (TEMP5,SIG,TEMP7,MIN,MAX,MAX)
      CALL MATMUL (TEMP7,TEMP6,P,MIN,MAX,MIN)
       RETURN
        END
C
C-----READ IN INPUTS-----
C
      SUBROUTINE INPUT(K,L,S,MIN,MAX)
      DIMENSION K(7),L(7)
      DOUBLE PRECISION S(7),CONVNM,CONVDR
      DATA CONVNM/6076.115D0/
      DATA CONVDR/57.2957795131D0/
C
      WRITE(5,101)
      READ(5,1)MAX
      MIN = 7-MAX
C
      WRITE(5,105)
      WRITE(5,106)
      WRITE(5,107)
      WRITE(5,108)
      IF(MAX .EQ. 4)READ(5,2)(K(I),I=1,4)
      IF(MAX .EQ. 5)READ(5,4)(K(I),I=1,5)
      IF(MAX .EQ. 6)READ(5,5)(K(I),I=1,6)
      WRITE(5,1)(K(I),I=1,MAX)
C
C-----FORM MATRIX L-----
C
      J=1
      DO 10 I=1,MAX
10       L(K(I))=1
C
C-----READ IN ERRORS-----
C
      DO 15 I=1,7
         IF(L(I)  .EQ.  0)GOTO 15
         GOTO (201,202,203,204,205,206,207),I
201   WRITE(5,151)
         GOTO 12
202   WRITE(5,152)
         GOTO 12
203   WRITE(5,153)
         GOTO 13
204   WRITE(5,154)
         GOTO 13
205   WRITE(5,155)
         GOTO 12
206   WRITE(5,156)
         GOTO 12
207   WRITE(5,157)
         GOTO 13
12    READ(5,3)S(I)
      S(I)=S(I)/CONVNM
         GOTO 15
13    READ(5,3)S(I)
      S(I)=S(I)/CONVDR
15    CONTINUE
C
      DO 20 I=1,7
         IF(L(I)  .NE.  0)GOTO 20
         K(J+MAX)=I
         J=J+1
20       CONTINUE
C
      RETURN
C
1     FORMAT(I4)
2     FORMAT(4I4)
3     FORMAT(F10.4)
4     FORMAT(5I4)
5     FORMAT(6I4)
101   FORMAT(1H$,'  ENTER NUMBER OF MEASUREMENTS -->')
105   FORMAT('  CHOOSE THE FOLLOWING MEASUREMENTS BY NUMBER:')
106   FORMAT('  1..RHO10'/'  2..RHO1T'/'  3..ALF10')
107   FORMAT('  4..ALFD1'/'  5..TAU1'/'  6..RHO0T'/'  7..BETA'/)
108   FORMAT(1H$,'  ENTER NUMBERS -->')
151   FORMAT(1H$,'  SIGMA RHO10 (FT) -->')
152   FORMAT(1H$,'  SIGMA RHO1T (FT) -->')
153   FORMAT(1H$,'  SIGMA ALF10 (DEG) -->')
154   FORMAT(1H$,'  SIGMA ALFD1 (DEG) -->')
155   FORMAT(1H$,'  SIGMA DTOA1 (FT) -->')
156   FORMAT(1H$,'  SIGMA RHO0T (FT) -->')
157   FORMAT(1H$,'  SIGMA BETA (DEG) -->')
       END
>
```

```
>PIP TI:=DK1:LIBR.FTN
C
C----- -----THIS ROUTINE TRANSPOSES A K*L MATRIX
C              NOTE: TA IS TRANSPOSED INTO TB
C
        SUBROUTINE TRANS(TA,TB,K,L)
        DOUBLE PRECISION TA(6,6),TB(6,6)
        DO 10 IND1=1,L
                DO 10 IND2=1,K
10              TB(IND1,IND2)=TA(IND2,IND1)
        RETURN
        END
C
        SUBROUTINE MATMUL(TA,TB,TC,M,N,P)
        INTEGER P
        DOUBLE PRECISION TA(6,6),TB(6,6),TC(6,6)
        CALL ZERO(TC,M,P)
        DO 10 I3=1,M
                DO 10 I2=1,P
                        DO 10 I1=1,N
10                      TC(I3,I2)=TC(I3,I2)+TA(I3,I1)*TB(I1,I2)
        RETURN
        END
C
C----- -----THIS ROUTINE ZEROES OUT A K*L MATRIX
C
        SUBROUTINE ZERO(T,K,L)
        DOUBLE PRECISION T(6,6)
        DO 10 IND1=1,K
                DO 10 IND2=1,L
10              T(IND1,IND2)=0.0D0
        RETURN
        END
C-----------------------------------------------------------------
        SUBROUTINE MATINV(A,N1,B,M1,ID)
C
        DOUBLE PRECISION  A(6,6),B(6,1),DETERM,SWAP,PIVOT,T,AMAX
        DIMENSION INDEX(6,3)
        EQUIVALENCE (IROW,JROW), (ICOLUM,JCOLUM), (AMAX, T, SWAP)
C
C----- ----- -->INITIALIZATION
        M=M1
        N=N1
        DETERM=1.0D0
        DO 20 J=1,N
20      INDEX(J,3)= 0
        DO 550 I=1,N
C
C----- ----- -->SEARCH FOR PIVOTAL ELEMENT
        AMAX=0.0D0
                DO 105 J=1,N
                IF(INDEX(J,3)-1) 60,105,60
60                      DO 100 K=1,N
                        IF(INDEX(K,3)-1) 80, 100, 715
80                      IF(AMAX - DABS(A(J,K))) 85, 100, 100
85                      IROW=J
                        ICOLUM=K
                        AMAX=DABS(A(J,K))
100                     CONTINUE
105             CONTINUE
        INDEX(ICOLUM,3) =INDEX(ICOLUM,3)+1
        INDEX(I,1)=IROW
        INDEX(I,2)=ICOLUM
C
C----- ----- -->INTERCHANGE ROWS TO PUT PIVOT ELEMENT ON DIAGONAL
        IF (IROW-ICOLUM) 140, 310, 140
140     DETERM=-DETERM
                DO 200 L=1,N
                SWAP= A(IROW,L)
                A(IROW,L) = A(ICOLUM,L)
200             A(ICOLUM,L) = SWAP
                IF(M)310,310,210
210     DO 250 L=1,M
            SWAP=B(IROW,L)
            B(IROW,L)=B(ICOLUM,L)
            B(ICOLUM,L)=SWAP
250     CONTINUE
C
C----- ----- -->DIVIDE PIVOT ROW BY PIVOT ELEMENT
310     PIVOT =  A(ICOLUM, ICOLUM)
        DETERM=DETERM*PIVOT
         A(ICOLUM,ICOLUM) = 1.0D0
                DO 350 L= 1, N
350             A(ICOLUM,L) =A(ICOLUM,L)/ PIVOT
355             IF(M)380,380,360
360             DO 370 L=1,M
370             B(ICOLUM,L) =B(ICOLUM,L)/ PIVOT
C
C----- ----- -->REDUCE NON-PIVOT ROWS
380             DO 550 L1= 1,N
                IF(L1-ICOLUM) 400,550, 400
400             T=A(L1,ICOLUM)
                A(L1,ICOLUM)=0.0D0
                    DO 450 L=1,N
450                 A(L1,L)= A(L1,L)- A(ICOLUM,L) *T
455                 IF(M)550,550,460
460                 DO 500 L=1,M
                    B(L1,L)= B(L1,L) - B(ICOLUM,L) * T
500                 CONTINUE
550     CONTINUE
C
C----- ----- -->INTERCHANGE COLUMNS
        DO 710 I=1,N
        L=N+1-I
        IF(INDEX(L,1) - INDEX(L,2)) 630, 710, 630
630     JROW=INDEX(L,1)
        JCOLUM= INDEX(L,2)
                DO 705 K=1,N
                SWAP = A(K,JROW)
                A(K,JROW) =A(K,JCOLUM)
                A(K,JCOLUM) = SWAP
705             CONTINUE
710     CONTINUE
        DO 730  K=1,N
        IF(INDEX(K,3) -1) 715,730, 715
715     ID  = 2
        GO TO 740
730     CONTINUE
        ID= 1
740     RETURN
        END
C
C=====CORRECT TRIG=====
C
        SUBROUTINE TRIG(ANG,S,C)
        DOUBLE PRECISION ANG,S,C,UNIT
C
```

```
      UNIT= 1.0D0
      S=DSIN(ANG)
      C=DCOS(ANG)
C
      IF(DABS(S)  .LT.  10D-6)GOTO 10
      IF(DABS(C)  .LT.  10D-6)GOTO 20
       RETURN
10    S=0.0D0
      C=DSIGN(UNIT,C)
       RETURN
20    C=0.0D0
      S=DSIGN(UNIT,S)
       RETURN
        END
>
```

DUAL SITE
COVARIANCE

```
>SET UIC=[130,130]
>PIP DK1: LI

DIRECTORY DK1:[130,130]
22-MAR-78 09:00

DUAL.CMD;2         1.        17-MAR-78 09:02
PLOTDR.OBJ;2       32.       21-MAR-78 13:12
PCOMP2.OBJ;21      15.       17-MAR-78 09:02
DUAL.TSK;16        80.     C 17-MAR-78 09:08
PLOTDR.OBJ;1       32.       21-MAR-78 13:07
PCOMP2.FTN;26      7.        17-MAR-78 09:02
VECTOR.OBJ;7       23.       17-MAR-78 09:02
PLOTDR.FTN;4       20.       21-MAR-78 13:11
VECTOR.FTN;51      10.       17-MAR-78 09:02
DUALP.TSK;1        75.     C 21-MAR-78 13:15
LIBR2.OBJ;4        17.       17-MAR-78 09:02
DUALPLOT.CMD;2     1.        21-MAR-78 13:13
PLOT2.OBJ;1        32.       21-MAR-78 15:44
PLOT2.FTN;2        20.       21-MAR-78 15:42
DRIVE2.OBJ;43      38.       17-MAR-78 09:02
DRIVE2.FTN;62      22.       17-MAR-78 09:02
LIBR2.FTN;3        7.        17-MAR-78 09:02
DUALP2.TSK;1       75.     C 21-MAR-78 15:46
DUALPLOT2.CMD;2    1.        21-MAR-78 15:44

      TOTAL OF 508. BLOCKS IN 19. FILES


>PIP TI:=DK1:DUAL.CMD
DK1:DUAL=DK1:DRIVE2,DK1:PCOMP2,DK1:LIBR2,DK1:VECTOR
/
LIBR=FORRES:RO
//
>PIP TI:=DK1:DUALPLOT.CMD
DK1:DUALP=DK1:PLOTDR,DK1:PCOMP2,DK1:LIBR2,DK1:VECTOR
/
LIBR=FORRES:RO
//
>PIP TI:=DK1:DUALPLOT2.CMD
DK1:DUALP2=DK1:PLOT2,DK1:PCOMP2,DK1:LIBR2,DK1:VECTOR
/
LIBR=FORRES:RO
//
>
```

```
>PIP TI:=DK1:DRIVE2.FTN
C------ ----- ----- ----- ----- ----- ----- ----- ----- -----
        DIMENSION K(12),L(12),IBLANK(20)
        DOUBLE PRECISION ERRMAT(100,7)
        DOUBLE PRECISION TEMP1(12,12),TEMP2(12,12),TEMP3(12,12)
        DOUBLE PRECISION TEMP4(12,12),A(12,12),B(12,12),P(12,12)
        DOUBLE PRECISION TEMP5(12,12),TEMP6(12,12),TEMP7(12,12)
        DOUBLE PRECISION RHOV12(3),RHOV10(3),RHOV0T(3),UNITX(3)
        DOUBLE PRECISION RHOV1T(3),RHOV20(3),RHOV2T(3)
        DOUBLE PRECISION DV1T(3),EV1T(3),TEMPV(3),S(12),T(12)
        DOUBLE PRECISION DV20(3),EV20(3),DV10(3),EV10(3),SIG(12,12)
        DOUBLE PRECISION DV2T(3),EV2T(3)
        DOUBLE PRECISION DV12(3),EV12(3),EOV12(3)
        DOUBLE PRECISION EV020(3),EV010(3),EV02T(3),EV01T(3)
        DOUBLE PRECISION ALF12,RHO12,H2,G,CEP
        DOUBLE PRECISION ALF10,RHO10,H0
        DOUBLE PRECISION BETA,RHO0T,HT,BETAX
        DOUBLE PRECISION RHO1T,SALF1T,TEMP,CALF1T
        DOUBLE PRECISION ALF1T,ALF1TC,RHO20,SALF20
        DOUBLE PRECISION CALF20,ALF20,ALF20C,RHO2T
        DOUBLE PRECISION SALF2T,CALF2T,ALF2T,ALF2TC
        DOUBLE PRECISION SALFD1,CALFD1,ALFD1,ALFD1C
        DOUBLE PRECISION SALFD2,CALFD2,ALFD2,ALFD2C
        DOUBLE PRECISION BETD1,BETD1C,SBETD1,CBETD1
        DOUBLE PRECISION BETD2,BETD2C,SBETD2,CBETD2
        DOUBLE PRECISION DTOA1,DTOA2,CONVDR,CONVNM
        DOUBLE PRECISION SGAM0,CGAM0,GAM0,GAM0C
        DOUBLE PRECISION SGAMT,CGAMT,GAMT,GAMTC,COL(6,12),AVER,SDEO
        DOUBLE PRECISION C1,C2,C3,C4,S1,S2,S3,S4
C
        DATA CONVDR/57.2957795131D0/    !DEG --> RAD CONV FACTOR
        DATA CONVNM/6076.115D0/         !NM CONVERSION
        DATA UNITX/1.0D0,0.0D0,0.0D0/   !UNIT VECTOR ON X
C
        WRITE(5,701)
        READ(5,791)IPRINT
C
        CALL INPUT(K,L,S,MIN,MAX)
C
C----- INPUT RADAR <2> POSITION RELATIVE TO RADAR <1>
200     WRITE(5,100)
        WRITE(5,101)
        READ(5,102)RHO12,ALF12,H2
           IF(H2 .NE. 0.0)H2=H2/CONVNM
           ALF12=ALF12/CONVDR
           RHOV12(1)=DSQRT(RHO12**2-H2**2)*DCOS(ALF12)
           RHOV12(2)=DSQRT(RHO12**2-H2**2)*DSIN(ALF12)
           RHOV12(3)=-H2
           WRITE(5,300)RHOV12
C
C----- INPUT <OWN> POSITION RELATIVE TO RADAR <1>
        WRITE(5,110)
        WRITE(5,111)
        READ(5,102)RHO10,ALF10,H0
           IF(H0 .NE. 0.0)H0=H0/CONVNM
           ALF10=ALF10/CONVDR
           RHOV10(1)=DSQRT(RHO10**2-H0**2)*DCOS(ALF10)
           RHOV10(2)=DSQRT(RHO10**2-H0**2)*DSIN(ALF10)
           RHOV10(3)=-H0
           WRITE(5,301)RHOV10
C
C----- INPUT <TARGET> POSITION RELATIVE TO <OWN>
        WRITE(5,120)
        WRITE(5,112)
        READ(5,142)RHO0T,HT
           IF(HT .NE. 0.0)HT=HT/CONVNM
C
C----- ----- BETA LOOP (EVERY <INPUT> DEGREES) -----
           WRITE(5,780)
           READ(5,781)ISTART,INCREM
           WRITE(5,793)
           NUMBER=1
C
        DO 999 II = ISTART,360,INCREM

           BETA=DBLE(FLOAT(II))
           BETAX=BETA/CONVDR
           IX=0
           IY=0
C
C
           RHOV0T(1)=DSQRT(RHO0T**2-HT**2)*DCOS(BETAX)
           RHOV0T(2)=DSQRT(RHO0T**2-HT**2)*DSIN(BETAX)
           RHOV0T(3)=-HT
C
C----- COMPUTE <TARGET> POSITION RELATIVE TO RADAR <1>
           CALL ADD(RHOV10,RHOV0T,RHOV1T)
C
C----- COMPUTE RANGE OF <TARGET> TO RADAR <1>
           CALL DOT(RHOV1T,RHOV1T,RHO1T)
           RHO1T=DSQRT(RHO1T)
C----- COMPUTE AZIMUTH OF <TARGET> RELATIVE TO RADAR <1>
           CALL LATERL(RHOV1T,DV1T)
           CALL UNIT(DV1T,EV1T)
           CALL CROSS(UNITX,EV1T,TEMPV)
           SALF1T=TEMPV(3)                   !SIN OF ALPHA 1T
           CALL DOT(UNITX,EV1T,TEMP)
           CALF1T=TEMP                       !COS OF ALPHA 1T
           ALF1T=DATAN2(SALF1T,CALF1T)
           ALF1TC=ALF1T*CONVDR               !CONVERT TO DEGREES
C
C----- COMPUTE POSITION OF <OWN> RELATIVE TO RADAR <2>
           CALL SUB(RHOV10,RHOV12,RHOV20)
C
C----- COMPUTE RANGE OF <OWN> TO RADAR <2>
           CALL DOT(RHOV20,RHOV20,RHO20)
           RHO20=DSQRT(RHO20)
C
C----- COMPUTE AZIMUTH OF <OWN> TO RADAR <2>
           CALL LATERL(RHOV20,DV20)
           CALL UNIT(DV20,EV20)
           CALL CROSS(UNITX,EV20,TEMPV)
           SALF20=TEMPV(3)                   !SIN OF ALPHA 20
           CALL DOT(UNITX,EV20,TEMP)
           CALF20=TEMP                       !COS OF ALPHA 20
           ALF20=DATAN2(SALF20,CALF20)
           ALF20C=ALF20*CONVDR               !CONVERT TO DEGREES
C       WRITE(5,805)ALF20C,BETA
805     FORMAT('  ALF20,BETA  --> ',2F10.4)
C
C----- COMPUTE POSITION OF <TARGET> RELATIVE TO RADAR <2>
           CALL ADD(RHOV20,RHOV0T,RHOV2T)
C
C----- COMPUTE RANGE OF <TARGET> TO RADAR <2>
           CALL DOT(RHOV2T,RHOV2T,RHO2T)
           RHO2T=DSQRT(RHO2T)
```

```
C
C----- COMPUTE AZIMUTH OF <TARGET> TO RADAR (2)
       CALL LATERL(RHOV2T,DV2T)
       CALL UNIT(DV2T,EV2T)
       CALL CROSS(UNITX,EV2T,TEMPV)
       SALF2T=TEMPV(3)                   !SIN OF ALPHA 2T
       CALL DOT(UNITX,EV2T,TEMP)
       CALF2T=TEMP                       !COS OF ALPHA 2T
       ALF2T=DATAN2(SALF2T,CALF2T)
C----- ----- ----- ----- ----- ----- -----
C----- COMPUTE DIFFERENTIAL AZIMUTHS -----
C----- ----- ----- ----- ----- ----- -----
       CALL LATERL(RHOV10,DV10)
       CALL UNIT(DV10,EV10)
       CALL CROSS(EV10,EV1T,TEMPV)
       SALFD1=TEMPV(3)                   !SIN OF DIFF ALPHA 1
       CALL DOT(EV10,EV1T,TEMP)
       CALFD1=TEMP                       !COS OF DIFF ALPHA 1
       ALFD1=DATAN2(SALFD1,CALFD1)
C
       CALL CROSS(EV20,EV2T,TEMPV)
       SALFD2=TEMPV(3)                   !SIN OF DIFF ALPHA 1
       CALL DOT(EV20,EV2T,TEMP)
       CALFD2=TEMP                       !COS OF DIFF ALPHA 2
       ALFD2=DATAN2(SALFD2,CALFD2)
C----- ----- ----- ----- ----- ----- ----- -----
C----- COMPUTE DIFFERENTIAL TIME OF ARRIVAL ----
C----- ----- ----- ----- ----- ----- ----- -----
       DTOA1=RHO1T+RHO0T-RHO10
       DTOA2=RHO2T+RHO0T-RHO20
C
C----- COMPUTE DIFFERENTIAL BETA1 AND BETA2 ANGLES -----
       CALL LATERL(RHOV12,DV12)
       CALL UNIT(DV12,EV12)
       CALL CROSS(EV10,EV12,TEMPV)
       SBETD1=TEMPV(3)                   !SIN OF DIFF BETA 1
       CALL DOT(EV10,EV12,TEMP)
       CBETD1=TEMP                       !COS OF DIFF BETA 1
       BETD1=DATAN2(SBETD1,CBETD1)
C
       G=-1.0D0
       CALL MULT(EV12,G,EOV12)
       CALL CROSS(EOV12,EV20,TEMPV)
       SBETD2=TEMPV(3)                   !SIN OF DIFF BETA 2
       CALL DOT(EOV12,EV20,TEMP)
       CBETD2=TEMP                       !COS OF DIFF BETA 2
       BETD2=DATAN2(SBETD2,CBETD2)
C----- ----- ----- ----- ----- ----- ----- ----- -----
C----- COMPUTE GAMMA <OWN> AND GAMMA <TARGET> -----
C----- ----- ----- ----- ----- ----- ----- ----- -----
       CALL MULT(EV10,G,EVO10)
       CALL MULT(EV20,G,EVO20)
       CALL CROSS(EVO20,EVO10,TEMPV)
       SGAM0=TEMPV(3)                    !SIN OF GAMMA <OWN>
       CALL DOT(EVO20,EVO10,TEMP)
       CGAM0=TEMP                        !COS OF GAMMA <OWN>
       GAM0=DATAN2(SGAM0,CGAM0)
C
       CALL MULT(EV2T,G,EVO2T)
       CALL MULT(EV1T,G,EVO1T)
       CALL CROSS(EVO2T,EVO1T,TEMPV)
       SGAMT=TEMPV(3)
       CALL DOT(EVO2T,EVO1T,TEMP)
       CGAMT=TEMP                        !COS GAMMA <TARGET>
```

```
          GAMT=DATAN2(SGAMT,CGAMT)
C===== ===== ===== ===== ===== ===== ===== =====
      DO 510 I=1,6
          DO 510 J=1,12
              COL(I,J)=0.0D0
510           CONTINUE
C
C=====COLUMN #1=====
      COL(1,1)=-1.0D0
      COL(2,1)=-1.0D0
C
C=====COLUMN #2=====
      CALL TRIG(ALFD1,S1,C1)
      COL(1,2)= 1.0D0
      COL(2,2)= C1
      COL(3,2)= S1
C
C=====COLUMN #3=====
      CALL TRIG(BETAX-ALF10,S2,C2)
      COL(2,3)= -RHO0T*S2
      COL(3,3)=  RHO0T*C2
C
C=====COLUMN #4=====
      COL(2,4)= -RHO1T*S1
      COL(3,4)=  RHO1T*C1
C
C=====COLUMN #5=====
      COL(1,5)=-1.0D0
C
C=====COLUMN #6=====
      COL(4,6)= -1.0D0
      COL(5,6)= -1.0D0
C
C=====COLUMN #7=====
      CALL TRIG(ALFD2,S3,C3)
      COL(4,7)= 1.0D0
      COL(5,7)= C3
      COL(6,7)= S3
C
C=====COLUMN #8=====
      CALL TRIG(BETAX-ALF20,S4,C4)
      COL(5,8)=-RHO0T*S4
      COL(6,8)= RHO0T*C4
C
C=====COLUMN #9=====
      COL(5,9)=-RHO2T*S3
      COL(6,9)= RHO2T*C3
C
C=====COLUMN #10=====
      COL(4,10)=-1.0D0
C
C=====COLUMN #11=====
      COL(1,11)= 1.0D0
      COL(2,11)=-C2
      COL(3,11)=-S2
      COL(4,11)= 1.0D0
      COL(5,11)=-C4
      COL(6,11)=-S4
C
C=====COLUMN #12=====
      COL(2,12)= RHO0T*S2
      COL(3,12)=-RHO0T*C2
      COL(5,12)= RHO0T*S4
      COL(6,12)=-RHO0T*C4
```

```
C
      DO 555 I=1,6
         DO 555 J=1,MAX
            B(I,J)=COL(I,K(J))
555   CONTINUE
C
      DO 556 I=1,6
         DO 556 J=1,MIN
            A(I,J)=-COL(I,K(J+MAX))
556   CONTINUE
C
C-----PRINTING SECTION-----
C
      IF(IPRINT .NE. 1)GOTO 600
      DO 855 I=1,6
         WRITE(5,856)(COL(I,J),J=1,12)
856      FORMAT('  COL ',6E11.3)
855   CONTINUE
      DO 801 I=1,6
         WRITE(5,802)(A(I,J),J=1,MIN)
801   CONTINUE
802   FORMAT(' A->',6E11.3)
C
600   DO 557 I=1,MAX
         SIG(I,I)=S(K(I))*S(K(I))
557   CONTINUE
C
      CALL PCOMP(A,B,SIG,P,MIN,MAX,ID,DET,
     +         TEMP1,TEMP2,TEMP3,TEMP4,TEMP5,TEMP6,TEMP7)
C
      IF(IPRINT .NE. 1)GOTO 605
      WRITE(5,808)ID,DET
808   FORMAT('  ID,DET --> ',I4,E10.2)
605   IF(ID  .EQ.  1   .AND.   DABS(DET)  .GT.  1.0D-4)GOTO 554
C
      DO 550 KK=1,MIN
         P(KK,KK)=10.0D12
550   CONTINUE
554   J=1
      DO 558 I=1,12
         IF(L(I)  .NE.  0)GOTO 558
         S(I)=DSQRT(P(J,J))
         J=J+1
558   CONTINUE
C
      DO 559 I=1,12
         IF(I.EQ.3  .OR. I.EQ.4 .OR. I.EQ.8 .OR. I.EQ.9 .OR.
     +      I.EQ.12)GOTO 561
         T(I)=S(I)*CONVNM
           GOTO 559
561      T(I)=S(I)*CONVDR
559   CONTINUE
C
      J=1
      DO 560 I=1,12
         IF(L(I)  .NE.  0)GOTO 560
         ERRMAT(NUMBER,J)=T(I)
         J=J+1
560   CONTINUE
      CEP=DSQRT(S(11)*S(11)+RHOOT*RHOOT*S(12)*S(12))
      CEP=CEP*CONVNM
      ERRMAT(NUMBER,MIN+1)=CEP
      WRITE(5,792)II,T(11),T(12),CEP
C
      NUMBER=NUMBER+1
C
999   CONTINUE
C
      NUMBER=NUMBER-2
      NUMCAN=0
C
581   WRITE(5,716)
      READ(5,791)IPRINT
      IF(IPRINT  .EQ.  1)GOTO 574
C
      WRITE(5,710)
      READ(5,791)ICHAN
      IF(ICHAN  .EQ.  2)GOTO 576
      WRITE(5,712)
      READ(5,791)NUMCAN
C
      DO 568 II=1,NUMCAN
         WRITE(5,714)II
         READ(5,791)IBLANK(II)
568   CONTINUE
C
      J=1
      I=1
565   IF(IBLANK(J)  .NE.  I)GOTO 567
         J=J+1
         IF(J  .GT.  NUMCAN)GOTO 569
         I=I+1
         GOTO 565
567   DO 571 KK=1,MIN+1
         ERRMAT(I-J+1,KK)=ERRMAT(I,KK)
571   CONTINUE
         I=I+1
         GOTO 565
569   CONTINUE
      DO 572 II=I+1,NUMBER
         DO 572 KK=1,MIN+1
            ERRMAT(II-J+1,KK)=ERRMAT(II,KK)
572         CONTINUE
C
      WRITE(5,716)
      READ (5,791)ICHAN
      IF(ICHAN  .EQ.  2)GOTO 576
574   DO 563 II=1,NUMBER-NUMCAN
         WRITE(5,722)II,(ERRMAT(II,J),J=MIN-1,MIN+1)
563   CONTINUE
      IF(IPRINT  .EQ.  1)GOTO 581
576   NUMBER=NUMBER-NUMCAN
      DO 578 II=1,MIN+1
         CALL STAT1(ERRMAT,II,NUMBER,AVER,SDEV)
         WRITE(5,744)II,AVER,SDEV
578   CONTINUE
C----- ----- ----- ----- ----- ----- ----- ----- ----- ----- -----
-----
100   FORMAT('  INPUT RADAR <2> POSITION RELATIVE TO RADAR <1>')
101   FORMAT(1H$,'  DISTANCE(NM), BEARING(DEG) AND HEIGHT(FT) -->
')
102   FORMAT(3F10.3)
103   FORMAT(F10.3)
110   FORMAT('  INPUT <OWN> POSITION RELATIVE TO RADAR <1>')
111   FORMAT(1H$,'  DISTANCE(NM), BEARING(DEG) AND ALTITUDE(FT) -
->')
112   FORMAT(1H$,'  DISTANCE(NM) AND ALTITUDE(FT) -->')
120   FORMAT('  INPUT <TARGET> POSITION RELATIVE TO <OWN>')
```

```
142    FORMAT(2F10.4)
300    FORMAT('  VECTOR RHOV12 -->   ',3F10.3,/)
301    FORMAT('  VECTOR RHOV10 -->   ',3F10.3,/)
701    FORMAT(1H$,'  WANT DEBUG PRINTOUTS (Y=1/N=2)-->')
710    FORMAT(1H$,'  ANY CHANGES (Y=1/N=2)-->')
712    FORMAT(1H$,'  HOW MANY CHANGES -->')
714    FORMAT(1H$,I5,' CHANGE ROW ?  ')
716    FORMAT(1H$,'  WANT TO SEE ERRMAT (Y=1/2=N)-->')
722    FORMAT('    ',I4,'   ',3F12.4)
744    FORMAT(//'   NUMBER,AVER,SD -->',I10,'   ',2F12.4)
780    FORMAT(1H$,'  BETA START, INCREMENT (DEG) -->')
781    FORMAT(2I4)
791    FORMAT(I4)
792    FORMAT(I4,3F12.4)
793    FORMAT(//'  BETA      RANGE      BEARING      CEP')
       STOP' --END OF BCAS PROGRAM--'
        END
>
```

```
>PIP TI:=DK1:PCOMP2.FTN
C
C-----CALCULATE P MATRIX-----
C
      SUBROUTINE PCOMP(A,B,SIG,P,MIN,MAX,ID,DET,
     *          TEMP1,TEMP2,TEMP3,TEMP4,TEMP5,TEMP6,TEMP7)
      DOUBLE PRECISION A(12,12),B(12,12),SIG(12,12),P(12,12)
      DOUBLE PRECISION TEMP1(12,12),TEMP2(12,12),TEMP3(12,12)
      DOUBLE PRECISION TEMP4(12,12),TEMP5(12,12),TEMP6(12,12)
      DOUBLE PRECISION TEMP7(12,12),TEMP8(12,1)
C
      CALL TRANS  (A,TEMP1,6,MIN)
      CALL MATMUL (TEMP1,A,TEMP2,MIN,6,MIN)
      DO 444 I=1,6
C        WRITE(5,448)(TEMP2(I,K),K=1,6)
         DO 445 J=1,6
            IF( DABS(TEMP2(I,J))  .LT.  1.0D-6)  TEMP2(I,J)=0.0D0
445      CONTINUE
C        WRITE(5,448)(TEMP2(I,K),K=1,6)
448      FORMAT('  TEMP2 -->',6E10.3)
444   CONTINUE
      CALL MATINV (TEMP2,MIN,TEMP8,0,ID,DET)
      CALL MATMUL (TEMP2,TEMP1,TEMP4,MIN,MIN,6)
      CALL MATMUL (TEMP4,B,TEMP5,MIN,6,MAX)
      CALL TRANS  (TEMP5,TEMP6,MIN,MAX)
      CALL MATMUL (TEMP5,SIG,TEMP7,MIN,MAX,MAX)
      CALL MATMUL (TEMP7,TEMP6,P,MIN,MAX,MIN)
       RETURN
        END
C
C-----READ IN INPUTS-----
C
      SUBROUTINE INPUT(K,L,S,MIN,MAX)
      DIMENSION K(12),L(12)
      DOUBLE PRECISION S(12),CONVNM,CONVDR
      DATA CONVNM/6076.115D0/
      DATA CONVDR/57.2957795131D0/
C
      WRITE(5,101)
      READ(5,1)MAX
      MIN = 12-MAX
C
      WRITE(5,105)
      WRITE(5,106)
      WRITE(5,107)
      WRITE(5,109)
      WRITE(5,110)
      WRITE(5,108)
      IF(MAX .EQ. 4)READ(5,2)(K(I),I=1,MAX)
      IF(MAX .EQ. 5)READ(5,4)(K(I),I=1,MAX)
      IF(MAX .EQ. 6)READ(5,5)(K(I),I=1,MAX)
      IF(MAX .EQ. 7)READ(5,7)(K(I),I=1,MAX)
      IF(MAX .EQ. 8)READ(5,8)(K(I),I=1,MAX)
      IF(MAX .EQ. 9)READ(5,9)(K(I),I=1,MAX)
      IF(MAX .EQ. 10)READ(5,100)(K(I),I=1,MAX)
      WRITE(5,1)(K(I),I=1,MAX)
C
C-----FORM MATRIX L-----
C
      J=1
      DO 10 I=1,MAX
10       L(K(I))=1
C
C-----READ IN ERRORS-----
C
      DO 15 I=1,12
         IF(L(I)  .EQ.  0)GOTO 15
         GOTO (201,202,203,204,205,206,
     *         207,208,209,210,211,212),I
201   WRITE(5,151)
         GOTO 12
202   WRITE(5,152)
         GOTO 12
203   WRITE(5,153)
         GOTO 13
204   WRITE(5,154)
         GOTO 13
205   WRITE(5,155)
         GOTO 12
206   WRITE(5,156)
         GOTO 12
207   WRITE(5,157)
         GOTO 12
208   WRITE(5,158)
         GOTO 13
209   WRITE(5,159)
         GOTO 13
210   WRITE(5,160)
         GOTO 12
211   WRITE(5,161)
         GOTO 12
212   WRITE(5,162)
         GOTO 13
12    READ(5,3)S(I)
      S(I)=S(I)/CONVNM
         GOTO 15
13    READ(5,3)S(I)
      S(I)=S(I)/CONVDR
15    CONTINUE
C
      DO 20 I=1,12
         IF(L(I)  .NE.  0)GOTO 20
         K(J+MAX)=I
         J=J+1
20       CONTINUE
C
      RETURN
C
1     FORMAT(I4)
2     FORMAT(4I4)
3     FORMAT(F10.4)
4     FORMAT(5I4)
5     FORMAT(6I4)
7     FORMAT(7I4)
8     FORMAT(8I4)
9     FORMAT(9I4)
100   FORMAT(10I4)
101   FORMAT(1H$,'  ENTER NUMBER OF MEASUREMENTS -->')
105   FORMAT('  CHOOSE THE FOLLOWING MEASUREMENTS BY NUMBER::')
106   FORMAT('  1..RHO10'/'  2..RHO1T'/'  3..ALF10')
107   FORMAT('  4..ALFD1'/'  5..DTOA1'/'  6..RHO20'/'  7..RHO2T')

109   FORMAT('  8..ALF20'/'  9..ALFD2'/'  10..DTOA2')
110   FORMAT('  11..RHOOT'/'  12..BETA'/)
108   FORMAT(1H$,'  ENTER NUMBERS -->')
151   FORMAT(1H$,'  SIGMA RHO10 (FT) -->')
152   FORMAT(1H$,'  SIGMA RHO1T (FT) -->')
```

```
153    FORMAT(1H$,' SIGMA ALF10 (DEG) -->')
154    FORMAT(1H$,' SIGMA ALFD1 (DEG) -->')
155    FORMAT(1H$,' SIGMA DTOA1 (FT) -->')
156    FORMAT(1H$,' SIGMA RHO20 (FT) -->')
157    FORMAT(1H$,' SIGMA RHO2T (FT) -->')
158    FORMAT(1H$,' SIGMA ALF20 (DEG) -->')
159    FORMAT(1H$,' SIGMA ALFD2 (DEG) -->')
160    FORMAT(1H$,' SIGMA DTOA2 (FT) -->')
161    FORMAT(1H$,' SIGMA RHO0T (FT) -->')
162    FORMAT(1H$,' SIGMA BETA (DEG) -->')
       END
>
```

```
>PIP TI:=DK1:LIBR8.FTN
C
C----- -----THIS ROUTINE TRANSPOSES A K*L MATRIX
C             NOTE: TA IS TRANSPOSED INTO TB
C
      SUBROUTINE TRANS(TA,TB,K,L)
      DOUBLE PRECISION TA(12,12),TB(12,12)
      DO 10 IND1=1,L
            DO 10 IND2=1,K
10          TB(IND1,IND2)=TA(IND2,IND1)
      RETURN
      END
C
      SUBROUTINE MATMUL(TA,TB,TC,M,N,P)
      INTEGER P
      DOUBLE PRECISION TA(12,12),TB(12,12),TC(12,12)
      CALL ZERO(TC,M,P)
      DO 10 I3=1,M
            DO 10 I2=1,P
                  DO 10 I1=1,N
10                TC(I3,I2)=TC(I3,I2)+TA(I3,I1)*TB(I1,I2)
      RETURN
      END
C
C----- -----THIS ROUTINE ZEROES OUT A K*L MATRIX
C
      SUBROUTINE ZERO(T,K,L)
      DOUBLE PRECISION T(12,12)
      DO 10 IND1=1,K
            DO 10 IND2=1,L
10          T(IND1,IND2)=0.0D0
      RETURN
      END
C-----------------------------------------------------------------
      SUBROUTINE MATINV(A,N1,B,M1,ID,DETERM)
C
      DOUBLE PRECISION  A(12,12),B(12,1),DETERM,SWAP,PIVOT,T,AMAX
      DIMENSION INDEX(12,3)
      EQUIVALENCE (IROW,JROW), (ICOLUM,JCOLUM), (AMAX, T, SWAP)
C
C----- ----- -->INITIALIZATION
      M=M1
      N=N1
      DETERM=1.0D0
      DO 20 J=1,N
20    INDEX(J,3)= 0
      DO 550 I=1,N
C
C----- ----- -->SEARCH FOR PIVOTAL ELEMENT
      AMAX=0.0D0
            DO 105 J=1,N
            IF(INDEX(J,3)-1) 60,105,60
60                DO 100 K=1,N
                  IF(INDEX(K,3)-1) 80, 100, 715
80                IF(AMAX - DABS(A(J,K))) 85, 100, 100
85                IROW=J
                  ICOLUM=K
                  AMAX=DABS(A(J,K))
100               CONTINUE
105         CONTINUE
      INDEX(ICOLUM,3) =INDEX(ICOLUM,3)+1
      INDEX(I,1)=IROW
      INDEX(I,2)=ICOLUM
C
C----- ----- -->INTERCHANGE ROWS TO PUT PIVOT ELEMENT ON DIAGONAL
      IF (IROW-ICOLUM) 140, 310, 140
140   DETERM=-DETERM
            DO 200 L=1,N
            SWAP= A(IROW,L)
            A(IROW,L) = A(ICOLUM,L)
200         A(ICOLUM,L) = SWAP
            IF(M)310,310,210
210   DO 250 L=1,M
         SWAP=B(IROW,L)
         B(IROW,L)=B(ICOLUM,L)
         B(ICOLUM,L)=SWAP
250   CONTINUE
C
C----- ----- -->DIVIDE PIVOT ROW BY PIVOT ELEMENT
310   PIVOT =  A(ICOLUM, ICOLUM)
      DETERM=DETERM*PIVOT
       A(ICOLUM,ICOLUM) = 1.0D0
            DO 350 L= 1, N
350         A(ICOLUM,L) =A(ICOLUM,L)/ PIVOT
355         IF(M)380,380,360
360         DO 370 L=1,M
370         B(ICOLUM,L) =B(ICOLUM,L)/ PIVOT
C
C----- ----- -->REDUCE NON-PIVOT ROWS
380         DO 550 L1= 1,N
            IF(L1-ICOLUM) 400,550, 400
400         T=A(L1,ICOLUM)
            A(L1,ICOLUM)=0.0D0
               DO 450 L=1,N
450            A(L1,L)= A(L1,L)- A(ICOLUM,L) *T
455            IF(M)550,550,460
460            DO 500 L=1,M
               B(L1,L)= B(L1,L) - B(ICOLUM,L) * T
500            CONTINUE
550   CONTINUE
C----- ----- -->INTERCHANGE COLUMNS
      DO 710 I=1,N
      L=N+1-I
      IF(INDEX(L,1) - INDEX(L,2)) 630, 710, 630
630   JROW=INDEX(L,1)
      JCOLUM= INDEX(L,2)
            DO 705 K=1,N
            SWAP = A(K,JROW)
            A(K,JROW) =A(K,JCOLUM)
            A(K,JCOLUM) = SWAP
705         CONTINUE
710   CONTINUE
      DO 730  K=1,N
      IF(INDEX(K,3) -1) 715,730, 715
715   ID  = 2
      GO TO 740
730   CONTINUE
      ID= 1
740   RETURN
      END
C
C-----CORRECT TRIG-----
C
      SUBROUTINE TRIG(ANG,S,C)
      DOUBLE PRECISION ANG,S,C,UNIT
C
```

DUAL ATCRBS

COVARIANCE

(12x20 FORMULATION)

```
>SET UIC=[160,160]
>PIP DK1: LI

DIRECTORY DK1:[160,160]
22-MAR-78 09:05

LIBR2.FTN;4         7.          17-MAR-78 09:03
LIBR2.OBJ;5         17.         17-MAR-78 09:03
OLDD.TSK;20         84.     C   17-MAR-78 09:03
VECTOR.OBJ;10       21.         17-MAR-78 09:03
OLDINPUT.OBJ;3      13.         17-MAR-78 09:03
VECTOR.FTN;52       9.          17-MAR-78 09:03
OLDDRIVE3.FTN;21    22.         17-MAR-78 09:03
OLDD.CMD;1          1.          17-MAR-78 09:03
OLDINPUT.FTN;3      7.          17-MAR-78 09:03
OLDDRIVE3.OBJ;16    39.         17-MAR-78 09:03
OLDCOLUMN.OBJ;12    14.         17-MAR-78 09:03
OLDCOLUMN.FTN;17    7.          17-MAR-78 09:03

    TOTAL OF 241. BLOCKS IN 12. FILES


>PIP DK1:0-U

>PIP TI:=DK1:OLDD.CMD
DK1:OLDD=DK1:OLDDRIVE3,DK1:OLDCOLUMN,DK1:OLDINPUT,DK1:VECTOR,DK1:LIBR2
/
LIBR=FORRES:RO
//
>
```

```
>PIP TI:=DK1:OLDDRIVE3.FTN
C----- ----- ----- ----- ----- ----- ----- ----- ----- -----
      DIMENSION K(20),L(20),IBLANK(20),INDEX(12,3)
      DOUBLE PRECISION ERRMAT(40,6),S(20),T(20),TEMPV(3),TEMP
      DOUBLE PRECISION TEMP1(12,12),TEMP2(12,12),TEMP3(12,12)
      DOUBLE PRECISION TEMP4(12,12),A(12,12),B(12,12),P(12,12)
      DOUBLE PRECISION TEMP5(12,12),TEMP6(12,12),TEMP7(12,12)
      DOUBLE PRECISION TEMP8(12,1),TEMP0(12,12),TEMPO(12,12)
C
      DOUBLE PRECISION RHOV12(3),RHOV10(3),RHOV0T(3),UNITX(3)
      DOUBLE PRECISION RHOV1T(3),RHOV20(3),RHOV2T(3),RHV0T2(3)
      DOUBLE PRECISION RHV1T2(3),RHV2T2(3),SIG(12,12)
C
      DOUBLE PRECISION EV20(3),EV2T(3),EV1T(3),EV10(3)
      DOUBLE PRECISION EV12(3),EOV12(3),EV1T2(3),EV2T2(3)
      DOUBLE PRECISION EVO20(3),EVO10(3),EVO2T(3),EVO1T(3)
C
      DOUBLE PRECISION H2,H0,HT2,HT,G
      DOUBLE PRECISION BETA,BETA1,BETA2
C
      DOUBLE PRECISION RHO10,RHO0T,RHO20,RHO12,RHO0T2
      DOUBLE PRECISION RHO1T,RHO1T2,RHO2T,RHO2T2
      DOUBLE PRECISION ALF1T,ALF1T2,ALF10,ALF12
      DOUBLE PRECISION ALF2T2,ALF20,ALF2T
      DOUBLE PRECISION ALFD11,ALFD12,ALFD21,ALFD22
C
      DOUBLE PRECISION CONVDR,CONVNM,DET
      DOUBLE PRECISION COL(12,20),AVER,SDEV,CEP1,CEP2
C
      DATA CONVDR/57.2957795131D0/    !DEG --> RAD CONV FACTOR
      DATA CONVNM/6076.115D0/         !NM CONVERSION
      DATA UNITX/1.0D0,0.0D0,0.0D0/   !UNIT VECTOR ON X
C
      WRITE(5,701)              !PRINTING CONTROL
      READ(5,791)IPRINT
C
      CALL INPUT(K,L,S,MIN,MAX)
C
C----- INPUT RADAR <2> POSITION RELATIVE TO RADAR <1>
200   WRITE(5,750)
      WRITE(5,751)
      READ(5,752)RHO12,ALF12,H2
         IF(H2 .NE. 0.0)H2=H2/CONVNM
         ALF12=ALF12/CONVDR
         RHOV12(1)=DSQRT(RHO12**2-H2**2)*DCOS(ALF12)
         RHOV12(2)=DSQRT(RHO12**2-H2**2)*DSIN(ALF12)
         RHOV12(3)=-H2
         WRITE(5,759)RHOV12
C
C----- INPUT <OWN> POSITION RELATIVE TO RADAR <1>
      WRITE(5,754)
      WRITE(5,755)
      READ(5,752)RHO10,ALF10,H0
         IF(H0 .NE. 0.0)H0=H0/CONVNM
         ALF10=ALF10/CONVDR
         RHOV10(1)=DSQRT(RHO10**2-H0**2)*DCOS(ALF10)
         RHOV10(2)=DSQRT(RHO10**2-H0**2)*DSIN(ALF10)
         RHOV10(3)=-H0
         WRITE(5,760)RHOV10
C
C----- COMPUTE POSITION OF <OWN> RELATIVE TO RADAR <2>
         CALL SUB(RHOV10,RHOV12,RHOV20)
C
C----- COMPUTE RANGE OF <OWN> TO RADAR <2>
         CALL DOT(RHOV20,RHOV20,RHO20)
         RHO20=DSQRT(RHO20)
C
C----- COMPUTE AZIMUTH OF <OWN> TO RADAR <2>
         CALL LUNIT(RHOV20,EV20)
         CALL CROSS(UNITX,EV20,TEMPV)
         CALL   DOT(UNITX,EV20,TEMP)
         ALF20=DATAN2(TEMPV(3),TEMP)
C
C----- INPUT <TARGET ONE> POSITION RELATIVE TO <OWN>
      WRITE(5,757)
      WRITE(5,756)
      READ(5,758)RHO0T,HT
         IF(HT .NE. 0.0)HT=HT/CONVNM
C-----INPUT <TARGET TWO> POSITION RELATIVE TO <OWN>
      WRITE(5,761)
      WRITE(5,755)
      READ(5,752)RHO0T2,BETA2,HT2
         BETA2=BETA2/CONVDR
         IF(HT2 .NE. 0.0D0)HT2=HT2/CONVNM
         RHV0T2(1)=DSQRT(RHO0T2**2-HT2**2)*DCOS(BETA2)
         RHV0T2(2)=DSQRT(RHO0T2**2-HT2**2)*DSIN(BETA2)
         RHV0T2(3)=-HT2
C
C-----COMPUTE <TARGET TWO> POSITION RELATIVE TO RADAR <1>
         CALL ADD(RHOV10,RHV0T2,RHV1T2)
C
C-----COMPUTE RANGE OF <TARGET TWO> RELATIVE TO RADAR <1>
         CALL DOT(RHV1T2,RHV1T2,RHO1T2)
         RHO1T2=DSQRT(RHO1T2)
C
C-----COMPUTE AZIMUTH OF <TARGET TWO> RELATIVE TO RADAR <1>
         CALL LUNIT(RHV1T2,EV1T2)
         CALL LUNIT(RHOV10,EV10)
         CALL CROSS(UNITX,EV1T2,TEMPV)
         CALL DOT(UNITX,EV1T2,TEMP)
         ALF1T2=DATAN2(TEMPV(3),TEMP)
         ALFD12=ALF1T2-ALF10
         CALL ANGMOD(ALFD12,ALFD12)
C
C----- COMPUTE <TARGET TWO> POSITION RELATIVE TO RADAR <2>
         CALL ADD(RHOV20,RHV0T2,RHV2T2)
C
C----- COMPUTE <TARGET TWO> RANGE RELATIVE TO RADAR <2>
         CALL DOT(RHV2T2,RHV2T2,RHO2T2)
         RHO2T2=DSQRT(RHO2T2)
C
C----- COMPUTE <TARGET TWO> AZIMUTH RELATIVE TO RADAR <2>
         CALL LUNIT (RHV2T2,EV2T2)
         CALL CROSS (UNITX,EV2T2,TEMPV)
         CALL DOT   (UNITX,EV2T2,TEMP)
         ALF2T2=DATAN2(TEMPV(3),TEMP)
         ALFD22=ALF2T2-ALF20
         CALL ANGMOD(ALFD22,ALFD22)           !MODULO 360
C
C
         WRITE(5,780)                 !BETA LOOP CONTROL
         READ(5,781)ISTART,ISTOP,INCREM
         WRITE(5,793)
         NUMBER=1             !SAMPLE COUNTER
C----- ----- ----- ----- ----- -----
C-----MAIN LOOP (STEP BETA DEGREES)
C----- ----- ----- ----- ----- -----
```

```
      DO 999 II = ISTART,ISTOP,INCREM
C
         BETA=DBLE(FLOAT(II))
         BETA1=BETA/CONVDR
         IX=0
         IY=0
C
C
         RHOV0T(1)=DSQRT(RHO0T**2-HT**2)*DCOS(BETA1)
         RHOV0T(2)=DSQRT(RHO0T**2-HT**2)*DSIN(BETA1)
         RHOV0T(3)=-HT
C
C----- COMPUTE <TARGET ONE> POSITION RELATIVE TO RADAR <1>
         CALL ADD(RHOV10,RHOV0T,RHOV1T)
C
C----- COMPUTE RANGE OF <TARGET ONE> TO RADAR <1>
         CALL DOT(RHOV1T,RHOV1T,RHO1T)
         RHO1T=DSQRT(RHO1T)
C
C----- COMPUTE AZIMUTH OF <TARGET ONE> RELATIVE TO RADAR <1>
         CALL LUNIT(RHOV1T,EV1T)
         CALL CROSS(UNITX,EV1T,TEMPV)
         CALL DOT(UNITX,EV1T,TEMP)
         ALF1T=DATAN2(TEMPV(3),TEMP)
C
C----- COMPUTE POSITION OF <TARGET ONE> RELATIVE TO RADAR <2>
         CALL ADD(RHOV20,RHOV0T,RHOV2T)
C
C----- COMPUTE RANGE OF <TARGET ONE> TO RADAR <2>
         CALL DOT(RHOV2T,RHOV2T,RHO2T)
         RHO2T=DSQRT(RHO2T)
C
C----- COMPUTE AZIMUTH OF <TARGET ONE> TO RADAR <2>
         CALL LUNIT(RHOV2T,EV2T)
         CALL CROSS(UNITX,EV2T,TEMPV)
         CALL DOT(UNITX,EV2T,TEMP)
         ALF2T=DATAN2(TEMPV(3),TEMP)
C----- ----- ----- ----- ----- ----- -----
C----- COMPUTE DIFFERENTIAL AZIMUTHS -----
C----- ----- ----- ----- ----- ----- -----
         CALL CROSS(EV10,EV1T,TEMPV)
         CALL DOT(EV10,EV1T,TEMP)
         ALFD11=DATAN2(TEMPV(3),TEMP)
C
         CALL CROSS(EV20,EV2T,TEMPV)
         CALL DOT(EV20,EV2T,TEMP)
         ALFD21=DATAN2(TEMPV(3),TEMP)
C----- ----- ----- ----- ----- ----- -----
C***** SETUP COLUMN, A AND B MATRICES*****
C----- ----- ----- ----- ----- ----- -----
      CALL COLUMN(COL,IPRINT,
     +             ALF10,ALF20,
     +             ALFD11,ALFD12,ALFD21,ALFD22,
     +             BETA1,BETA2,
     +             RHO0T,RHO0T2,RHO1T,RHO1T2,RHO2T,RHO2T2,
     +             RHO10,RHO20)
C
C
      DO 555 I=1,12
         DO 555 J=1,MAX
            B(I,J)=COL(I,K(J))
555   CONTINUE
C
      DO 556 I=1,12
         DO 556 J=1,MIN
            A(I,J)=-COL(I,K(J+MAX))
556   CONTINUE
C
      DO 557 I=1,MAX
         SIG(I,I)=S(K(I))*S(K(I))
557   CONTINUE
C----- ----- ----- ----- ----- -----
C*****PRINTING SECTION*****
C----- ----- ----- ----- ----- -----
      IF(IPRINT .NE. 1)GOTO 600
C
      WRITE(5,813)MAX,MIN
813   FORMAT('  MAX,MIN -->',2I6)
      WRITE(5,810)L
      WRITE(5,810)K
      WRITE(5,812)S
810   FORMAT(4(5I4,/))
812   FORMAT(4(5E12.3,/))
C
      DO 805 I=1,12
         WRITE(5,807)I
         WRITE(5,803)(COL(I,J),J=1,20)
803      FORMAT(4(5E11.3,/))
807      FORMAT('  COL ',I4,' == ')
805      CONTINUE
      DO 801 I=1,12
         WRITE(5,809)I
         WRITE(5,802)(A(I,J),J=1,MIN)
802      FORMAT(6E11.3)
809      FORMAT('  A-->',I4,' == ')
801      CONTINUE
C
C
C----- ----- ----- ----- ----- -----
C*****CALCULATE P MATRIX*****
C----- ----- ----- ----- ----- -----
600   CALL TRANS  (A,TEMP1,12,MIN)
      CALL MATMUL (TEMP1,A,TEMP2,MIN,12,MIN)
      DO 444 I=1,12
C        WRITE(5,448)(TEMP2(I,K),K=1,4)
         DO 445 J=1,12
            IF( DABS(TEMP2(I,J))  .LT.  1.0D-6)  TEMP2(I,J)=0.0
D0
445      CONTINUE
C        WRITE(5,448)(TEMP2(I,K),K=1,4)
448      FORMAT('  TEMP2 -->',4E13.5)
444   CONTINUE
      CALL MATINV (TEMP2,MIN,TEMP8,0,ID,DET,INDEX)
      CALL MATMUL (TEMP2,TEMP1,TEMP4,MIN,MIN,12)
      CALL MATMUL (TEMP4,B,TEMP5,MIN,12,MAX)
      CALL TRANS  (TEMP5,TEMP6,MIN,MAX)
      CALL MATMUL (TEMP5,SIG,TEMP7,MIN,MAX,MAX)
      CALL MATMUL (TEMP7,TEMP6,P,MIN,MAX,MIN)
C
C
      IF(IPRINT .EQ. 1)WRITE(5,808)ID,DET
808   FORMAT('  ID,DET --> ',I4,E10.2)
605   IF(ID  .EQ.  1   .AND.   DABS(DET)  .GT.  1.0D-4)GOTO 554
C
      DO 550 KK=1,MIN
         P(KK,KK)=10.0D12
550   CONTINUE
554   J=1
```

```
      DO 558 I=1,20
         IF(L(I)  .NE.  0)GOTO 558
         S(I)=DSQRT(P(J,J))
         J=J+1
558   CONTINUE
      IF(IPRINT .EQ. 1)WRITE(5,812)S
C
      DO 559 I=1,20
         IF(I.EQ.3  .OR. I.EQ.4 .OR. I.EQ.7 .OR. I.EQ.11 .OR.
     +   I.EQ.12 .OR. I.EQ.15  .OR.  I.EQ.18  .OR.  I.EQ.20)GOTO 561
         T(I)=S(I)*CONVNM
            GOTO 559
561      T(I)=S(I)*CONVDR
559   CONTINUE
      IF(IPRINT .EQ. 1)WRITE(5,812)T
C
         ERRMAT(NUMBER,1)=T(17)
         ERRMAT(NUMBER,2)=T(18)
         ERRMAT(NUMBER,3)=T(19)
         ERRMAT(NUMBER,4)=T(20)
      CEP1=DSQRT(S(17)*S(17)+RHO0T*RHO0T*S(18)*S(18))
      CEP2=DSQRT(S(19)*S(19)+RHO0T2*RHO0T2*S(20)*S(20))
      CEP1=CEP1*CONVNM
      CEP2=CEP2*CONVNM
         ERRMAT(NUMBER,5)=CEP1
         ERRMAT(NUMBER,6)=CEP2
      WRITE(5,792)II,T(17),T(18),T(19),T(20),CEP1,CEP2
C
      NUMBER=NUMBER+1
C
999   CONTINUE
C
      NUMBER=NUMBER-2
      NUMCAN=0
C
581   WRITE(5,716)
      READ(5,791)IPRINT
      IF(IPRINT  .EQ.  1)GOTO 574
C
      WRITE(5,710)
      READ(5,791)ICHAN
      IF(ICHAN  .EQ.  2)GOTO 576
      WRITE(5,712)
      READ(5,791)NUMCAN
C
      DO 568 II=1,NUMCAN
         WRITE(5,714)II
         READ(5,791)IBLANK(II)
568   CONTINUE
C
      J=1
      I=1
565   IF(IBLANK(J)  .NE.  I)GOTO 567
         J=J+1
         IF(J  .GT.  NUMCAN)GOTO 569
         I=I+1
         GOTO 565
567   DO 571 KK=1,6
         ERRMAT(I-J+1,KK)=ERRMAT(I,KK)
571   CONTINUE
         I=I+1
         GOTO 565
569   CONTINUE
      DO 572 II=I+1,NUMBER
         DO 572 KK=1,6
            ERRMAT(II-J+1,KK)=ERRMAT(II,KK)
572         CONTINUE
C
      WRITE(5,716)
      READ (5,791)ICHAN
      IF(ICHAN  .EQ.  2)GOTO 576
574   DO 563 II=1,NUMBER-NUMCAN
         WRITE(5,722)II,(ERRMAT(II,J),J=1,6)
      CONTINUE
      IF(IPRINT  .EQ.  1)GOTO 581
576   NUMBER=NUMBER-NUMCAN
      DO 578 II=1,6
         CALL STAT1(ERRMAT,II,NUMBER,AVER,SDEV)
         WRITE(5,744)II,AVER,SDEV
578   CONTINUE
C ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- -----
103   FORMAT(F10.3)
701   FORMAT(1H$,'  WANT DEBUG PRINTOUTS (Y=1/N=2)-->')
710   FORMAT(1H$,'  ANY CHANGES (Y=1/N=2)-->')
712   FORMAT(1H$,'  HOW MANY CHANGES -->')
714   FORMAT(1H$,I5,' CHANGE ROW ?  ')
716   FORMAT(1H$,'  WANT TO SEE ERRMAT (Y=1/2=N)-->')
722   FORMAT(' ',I4,'   ',6F11.3)
744   FORMAT(//'  NUMBER,AVER,SD -->',I10,'   ',2F12.4)
750   FORMAT('  INPUT RADAR <2> POSITION RELATIVE TO RADAR <1>')
751   FORMAT(1H$,'  DISTANCE(NM), BEARING(DEG) AND ALTITUDE(FT) -
     ->')
752   FORMAT(3F10.3)
754   FORMAT('  INPUT <OWN> POSITION RELATIVE TO RADAR <1>')
755   FORMAT(1H$,'  DISTANCE(NM), BEARING(DEG) AND ALTITUDE(FT) -
     ->')
756   FORMAT(1H$,'  DISTANCE(NM), AND ALTITUDE(FT) -->')
757   FORMAT('  INPUT <TARGET ONE> POSITION RELATIVE TO <OWN>')
758   FORMAT(2F10.4)
759   FORMAT('  VECTOR RHOV12 -->   ',3F10.3,/)
760   FORMAT('  VECTOR RHOV10 -->   ',3F10.3,/)
761   FORMAT('  INPUT <TARGET TWO> POSITION RELATIVE TO <OWN>')
780   FORMAT(1H$,'  BETA START,STOP INCREMENT (DEG) -->')
781   FORMAT(3I4)
791   FORMAT(I4)
792   FORMAT(I4,6E11.3)
793   FORMAT(/'  BETA        RANGE1,2      BEARING1,2       CEP1     C
     EP2')
      STOP' --END OF BCAS PROGRAM--'
       END
C
C-----
C
      SUBROUTINE LUNIT(VECTOR,EVEC)
      DOUBLE PRECISION VECTOR(3),EVEC(3),DVEC(3)
         CALL LATERL(VECTOR,DVEC)
         CALL UNIT(DVEC,EVEC)
      RETURN
       END
>
```

```
>PIP TI:=DK1:OLDCOLUMN.FTN
      SUBROUTINE COLUMN(COL,IPRINT,
     +                  ALF10,ALF20,
     +                  ALFD11,ALFD12,ALFD21,ALFD22,
     +                  BETA1,BETA2,
     +                  RHO0T,RHO0T2,RHO1T,RHO1T2,RHO2T,RHO2T2,
     +                  RHO10,RHO20)
C
      DOUBLE PRECISION COL(12,20),ALF10,ALF20
      DOUBLE PRECISION ALFD11,ALFD12,ALFD21,ALFD22
      DOUBLE PRECISION BETA1,BETA2
      DOUBLE PRECISION RHO0T,RHO0T2,RHO1T,RHO1T2,RHO2T2,RHO2T
      DOUBLE PRECISION RHO10,RHO20
      DOUBLE PRECISION C1,C2,C3,C4,C5,C6,C7,C8,C9,C10,C11,C12
      DOUBLE PRECISION S1,S2,S3,S4,S5,S6,S7,S8,S9,S10,S11,S12
C
      IF(IPRINT .NE. 1)GOTO 777
      WRITE(5,990)ALF10,ALF20,ALFD11,ALFD12,ALFD21,ALFD22
      WRITE(5,990)BETA1,BETA2,RHO0T,RHO0T2,RHO1T,RHO1T2,RHO2T,RHO2T2
990   FORMAT('    ',6F10.4)
C----- ----- ----- ----- ----- ----- ----- -----
777   DO 510 I=1,12
         DO 510 J=1,20
            COL(I,J)=0.0D0
510         CONTINUE
C
      CALL TRIG(ALFD11,S1,C1)
      CALL TRIG(BETA1-ALF10,S2,C2)
      CALL TRIG(BETA2-ALF10,S3,C3)
      CALL TRIG(ALFD12,S4,C4)
      CALL TRIG(ALFD21,S5,C5)
      CALL TRIG(BETA1-ALF20,S6,C6)
      CALL TRIG(BETA2-ALF20,S7,C7)
      CALL TRIG(ALFD22,S8,C8)
      CALL TRIG(ALF10-ALF20,S10,C10)
      CALL TRIG(ALF10-ALF20+ALFD11-ALFD21,S11,C11)
      CALL TRIG(ALF10-ALF20+ALFD12-ALFD22,S12,C12)
C
C-----COLUMN #1-----
      COL(1,1) = -1.0D0
      COL(2,1) = -1.0D0
      COL(4,1) = -1.0D0
      COL(5,1) = -1.0D0
C
C-----COLUMN #2-----
      COL(1,2) = 1.0D0
      COL(2,2)= C1
      COL(3,2) = S1
      COL(12,2)= RHO1T-RHO2T*C11
C
C-----COLUMN #3-----
      COL(2,3) = -RHO0T*S2
      COL(3,3) =  RHO0T*C2
      COL(5,3) = -RHO0T2*S3
      COL(6,3) =  RHO0T2*C3
      COL(12,3)=  RHO1T*RHO2T*S11 - RHO1T2*RHO2T2*S12
C
C-----COLUMN #4-----
      COL(2,4) = -RHO1T*S1
      COL(3,4) =  RHO1T*C1
      COL(12,4)=  RHO1T*RHO2T*S11
C
C-----COLUMN #5-----
      COL(1,5) = -1.0D0
C
C-----COLUMN #6-----
      COL(4,6) = 1.0D0
      COL(5,6) = C4
      COL(6,6) = S4
      COL(12,6)= -RHO1T2+RHO2T2*C12
C
C-----COLUMN #7-----
      COL(5,7) = -RHO1T2*S4
      COL(6,7) =  RHO1T2*C4
      COL(12,7)=  -RHO1T2*RHO2T2*S12
C
C-----COLUMN #8-----
      COL(4,8) = -1.0D0
C
C-----COLUMN #9-----
      COL(7,9)  = -1.0D0
      COL(8,9)  = -1.0D0
      COL(10,9) = -1.0D0
      COL(11,9) = -1.0D0
C
C-----COLUMN #10-----
      COL(7,10) = 1.0D0
      COL(8,10) = C5
      COL(9,10) = S5
      COL(12,10)= RHO2T-RHO1T*C11
C
C-----COLUMN #11-----
      COL(8,11)  = -RHO0T*S6
      COL(9,11)  =  RHO0T*C6
      COL(11,11) = -RHO0T2*S7
      COL(12,11) =  -RHO1T*RHO2T*S11 + RHO1T2*RHO2T2*S12
C
C-----COLUMN #12-----
      COL(8,12)  =  -RHO2T*S5
      COL(9,12)  =   RHO2T*C5
      COL(12,12) =  -RHO1T*RHO2T*S11
C
C-----COLUMN #13-----
      COL(7,13) = -1.0D0
C
C-----COLUMN #14-----
      COL(10,14) = 1.0D0
      COL(11,14) = C8
      COL(12,14) = -RHO2T2+RHO1T2*C12
C
C-----COLUMN #15-----
      COL(11,15) = -RHO2T2*S8
      COL(12,15) =  RHO1T2*RHO2T2*S12
C
C-----COLUMN #16-----
      COL(10,16) = -1.0D0
C
C-----COLUMN #17-----
      COL(1,17) = 1.0D0
      COL(2,17) = -C2
      COL(3,17) = -S2
      COL(7,17) = 1.0D0
      COL(8,17) = -C6
      COL(9,17) = -S6
C
C-----COLUMN #18-----
      COL(2,18) = RHO0T*S2
```

```
      COL(3,18) = -COL(3,3)
      COL(8,18) = -COL(8,11)
      COL(9,18) = -COL(9,11)
C
C-----COLUMN #19-----
      COL(4,19)  = 1.0D0
      COL(5,19)  = -C3
      COL(6,19)  = -S3
      COL(10,19) = 1.0D0
      COL(11,19) = -C7
      COL(12,19) = -S7
C
C-----COLUMN #20-----
      COL(5,20)  = -COL(5,3)
      COL(6,20)  = -COL(6,3)
      COL(11,20) = -COL(11,11)
      COL(12,20) = -COL(12,11)
C
       RETURN
        END
>
```

```
>PIP TI:=DK1:OLDINPUT.FTN
C
C-----READ IN INPUTS-----
C
      SUBROUTINE INPUT(K,L,S,MIN,MAX)
      DIMENSION K(20),L(20)
      DOUBLE PRECISION S(20),CONUNM,CONVDR
      DATA CONUNM/6076.115D0/
      DATA CONVDR/57.295779513ID0/
C
      WRITE(5,101)
      READ(5,1)MAX
      MIN = 20-MAX
C
      WRITE(5,105)
      WRITE(5,106)
      WRITE(5,107)
      WRITE(5,109)
      WRITE(5,110)
      WRITE(5,111)
      WRITE(5,108)
      IF(MAX .EQ. 8)READ(5,2)(K(I),I=1,MAX)
      IF(MAX .EQ. 9)READ(5,4)(K(I),I=1,MAX)
      IF(MAX .EQ. 10)READ(5,5)(K(I),I=1,MAX)
      IF(MAX .EQ. 11)READ(5,7)(K(I),I=1,MAX)
      IF(MAX .EQ. 12)READ(5,8)(K(I),I=1,MAX)
      WRITE(5,1)(K(I),I=1,MAX)
C
C-----FORM MATRIX L-----
C
      J=1
      DO 10 I=1,MAX
10        L(K(I))=1
C
C-----READ IN ERRORS-----
C
      DO 15 I=1,20
          IF(L(I)  .EQ.  0)GOTO 15
          GOTO (201,202,203,204,205,
     +          206,207,208,209,210,
     +          211,212,213,214,215,
     +          216,217,218,219,220),I
201   WRITE(5,151)
          GOTO 12
202    WRITE(5,152)
           GOTO 12
203     WRITE(5,153)
            GOTO 13
204      WRITE(5,154)
             GOTO 13
205       WRITE(5,155)
              GOTO 12
206   WRITE(5,170)
          GOTO 12
207    WRITE(5,171)
           GOTO 13
208     WRITE(5,172)
            GOTO 12
209      WRITE(5,156)
             GOTO 12
210       WRITE(5,157)
              GOTO 12
211   WRITE(5,158)
          GOTO 13
212    WRITE(5,159)
           GOTO 13
213     WRITE(5,160)
            GOTO 12
214      WRITE(5,173)
             GOTO 12
215       WRITE(5,174)
              GOTO 13
216   WRITE(5,175)
          GOTO 12
217    WRITE(5,161)
           GOTO 12
218     WRITE(5,162)
            GOTO 13
219      WRITE(5,176)
             GOTO 12
220       WRITE(5,177)
              GOTO 13
C
12    READ(5,3)S(I)
      S(I)=S(I)/CONUNM
          GOTO 15
13    READ(5,3)S(I)
      S(I)=S(I)/CONVDR
15    CONTINUE
C
      DO 20 I=1,20
          IF(L(I)  .NE.  0)GOTO 20
          K(J+MAX)=I
          J=J+1
20        CONTINUE
C
      WRITE(5,888)K
888   FORMAT('  K--> ',4(5I6,/))
      RETURN
C
1     FORMAT(I4)
2     FORMAT(8I4)
3     FORMAT(F10.4)
4     FORMAT(9I4)
5     FORMAT(10I4)
7     FORMAT(11I4)
8     FORMAT(12I4)
101   FORMAT(1H$,'  ENTER NUMBER OF MEASUREMENTS -->')
105   FORMAT('  CHOOSE THE FOLLOWING MEASUREMENTS BY NUMBER::')
106   FORMAT('  1..RHO10     2..RHO1T     3..ALF10     4..ALFD11')
107   FORMAT('  5..DTOA11    6..RHO1T2    7..ALFD12    8..DTOA12')
109   FORMAT('  9..RHO20    10..RHO2T    11..ALF20    12..ALFD21')
110   FORMAT(' 13..DTOA21   14..RHO2T2   15..ALFD22   16..DTOA22')
111   FORMAT(' 17..RHO0T    18..BETA1    19..RHO0T2   20..BETA2'/)
108   FORMAT(1H$,'  ENTER NUMBERS -->')
151   FORMAT(1H$,'  SIGMA RHO10 (FT) -->')
152    FORMAT(1H$,'  SIGMA RHO1T (FT) -->')
153     FORMAT(1H$,'  SIGMA ALF10 (DEG) -->')
154      FORMAT(1H$,'  SIGMA ALFD11 (DEG) -->')
155   FORMAT(1H$,'  SIGMA DTOA11 (FT) -->')
170    FORMAT(1H$,'  SIGMA RHO1T2 (FT) -->')
171     FORMAT(1H$,'  SIGMA ALFD12 (DEG) -->')
172      FORMAT(1H$,'  SIGMA DTOA12 (FT) -->')
156   FORMAT(1H$,'  SIGMA RHO20 (FT) -->')
157    FORMAT(1H$,'  SIGMA RHO2T (FT) -->')
158     FORMAT(1H$,'  SIGMA ALF20 (DEG) -->')
159      FORMAT(1H$,'  SIGMA ALFD21 (DEG) -->')
```

```
160       FORMAT(1H$,'  SIGMA DTOA21 (FT) -->')
173        FORMAT(1H$,'  SIGMA RHO2T2 (FT) -->')
174         FORMAT(1H$,'  SIGMA ALFD22 (DEG) -->')
175          FORMAT(1H$,'  SIGMA DTOA22 (FT) -->')
161       FORMAT(1H$,'  SIGMA RHO0T1 (FT) -->')
162        FORMAT(1H$,'  SIGMA BETA1 (DEG) -->')
176         FORMAT(1H$,'  SIGMA RHO0T2 (FT) -->')
177          FORMAT(1H$,'  SIGMA BETA2 (DEG) -->')
           END
>
```

DATA FOR

BCAS MODES

USED

IN

THE

RECOMMENDED CONCEPT

ATTACHMENT II

SUMMARY CHART

Mode	Range BCAS/Target	Comments
Single #7	10/5 20/8 50/10 100/20	ATCRBS
Single #9	10/5 20/8 50/10 100/20	Semi-active ATCRBS and DABS
Single #15	10/5 20/8 50/10 100/20	Semi-active ATCRBS
Single #15	10/5 20/8 50/10 100/20	Semi-active ATCRBS with Directional Antenna with 1^{o} Error
Single #20	10/5 20/8 50/10 100/20	Semi-active ATCRBS and DABS
Dual #13	10/5 20/8 50/10 100/20	Semi-active ATCRBS Passive
Dual #20	10/5 20/8 50/10 100/20	Passive
Dual #26	10/5 20/8 50/10 100/20	Semi-active

SUMMARY CHART (CONTINUED)

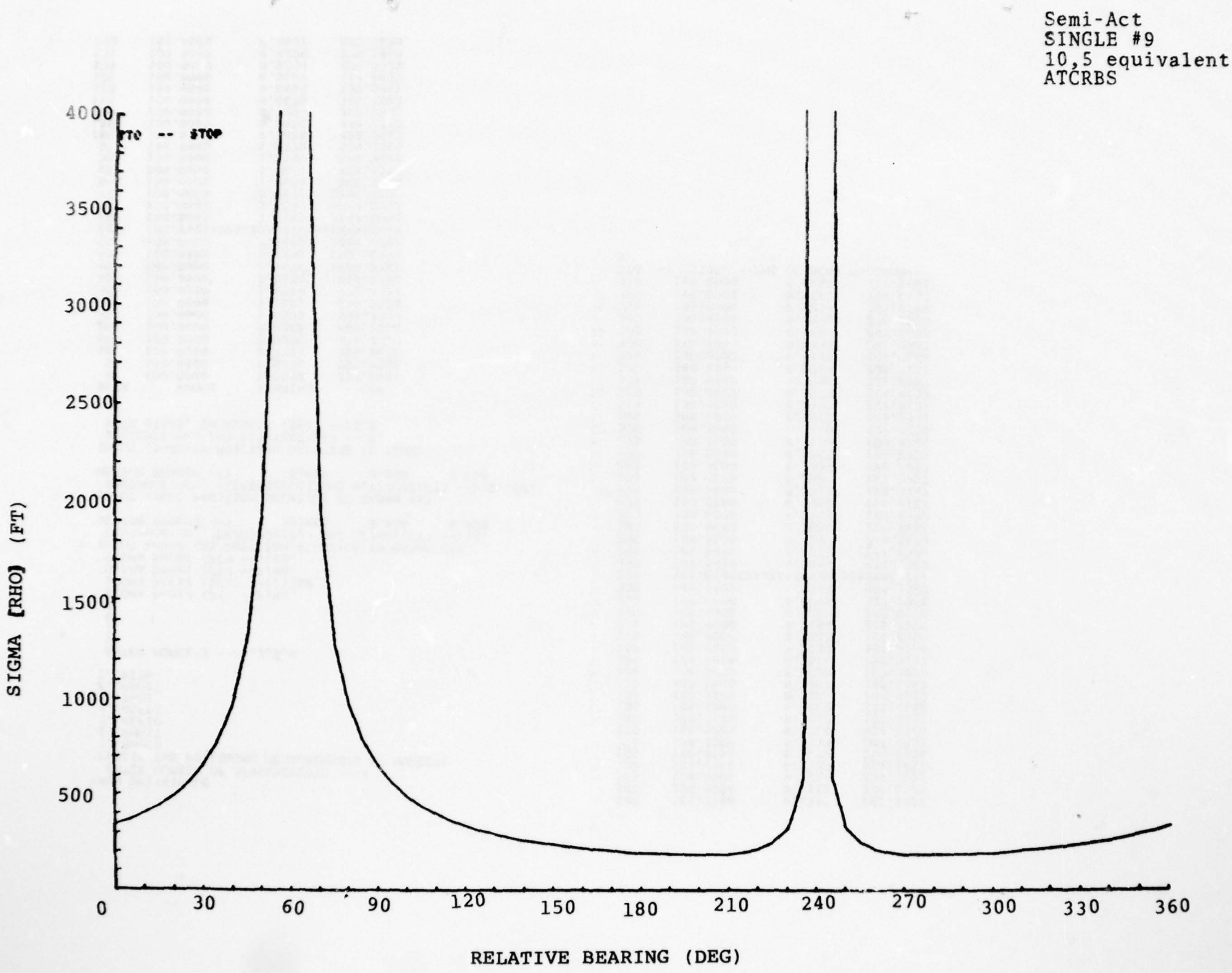
Mode	Range BCAS/Target	Comments
Dual #26	10/5 20/8 50/10 100/20	Passive with Directional Antenna with 1° Error
Dual #26	10/5 20/8 50/10 100/20	Semi-active with Directional Antenna with 1° Error
Dual #32	10/5 20/8 50/10 100/20	Transfer Algorithm

```
>RUN DK1:SINGLE
 ENTER NUMBER OF MEASUREMENTS -->4
 CHOOSE THE FOLLOWING MEASUREMENTS BY NUMBER:
1..RHO10
2..RHO1T
3..ALF10
4..ALFD1
5..TAU1
6..PHOOT
7..BETA

 ENTER NUMBERS -->1,3,4,5
 1
 3
 4
 5
 SIGMA RHO10 (FT) -->100.
 SIGMA ALF10 (DEG) -->.1768
 SIGMA ALFD1 (DEG) -->.25
 SIGMA DTOA1 (FT) -->100.
INPUT RADAR (2) POSITION RELATIVE TO RADAR (1)
 DISTANCE(NM), BEARING(DEG) AND HEIGHT(FT) -->10.
VECTOR RHOV12 -->         10.000     0.000     0.000

INPUT (OWN) POSITION RELATIVE TO RADAR (1)
 DISTANCE(NM), BEARING(DEG) AND ALTITUDE(FT) -->10.,60.
VECTOR RHOV10 -->          5.000     8.660     0.000

INPUT (TARGET) POSITION RELATIVE TO (OWN)
 DISTANCE(NM) AND ALTITUDE(FT) -->5.
 BETA START, INCREMENT (DEG) -->0,5

BETA      RANGE        BEARING        CEP
  0     138.4316       0.6907     391.5207
  5     129.4289       0.7030     394.5698
 10     120.3002       0.7143     397.4131
 15     111.0979       0.7248     400.0315
 20     101.8912       0.7342     402.4092
 25      92.7716       0.7426     404.5331
 30      33.8631       0.7499     406.3928
 35      75.3368       0.7562     407.9796
 40      67.4319       0.7613     409.2866
 45      60.4808       0.7654     410.3085
 50      54.9245       0.7682     411.0412
 55      51.2785       0.7700     411.4819
 60      50.0000       0.7706     411.6290
 65      51.2785       0.7700     411.4819
 70      54.9245       0.7682     411.0412
 75      60.4808       0.7654     410.3085
 80      67.4319       0.7613     409.2866
 85      75.3368       0.7562     407.9796
 90      83.8631       0.7499     406.3928
 95      92.7716       0.7426     404.5331
100     101.8912       0.7342     402.4092
105     111.0979       0.7248     400.0315
110     120.3002       0.7143     397.4131
115     129.4289       0.7030     394.5698
120     138.4316       0.6907     391.5207
125     147.2688       0.6776     388.2893
130     155.9120       0.6637     384.9041
135     164.3425       0.6491     381.4004
140     172.5520       0.6339     377.8219
145     180.5437       0.6182     374.2229
150     188.3343       0.6021     370.6723
155     195.9574       0.5858     367.2581
160     203.4699       0.5694     364.0940
165     210.9596       0.5532     361.3299
170     218.5592       0.5375     359.1668
175     226.4671       0.5226     357.8801
180     234.9823       0.5090     357.8568
185     244.5629       0.4973     359.6575
190     255.9296       0.4885     364.1226
195     270.2575       0.4836     372.5667
200     289.5505       0.4847     387.1519
205     317.4248       0.4943     411.6621
210     360.8862       0.5172     453.2501
215     434.8132       0.5611     526.8569
220     575.0682       0.6418     668.2142
225     886.2690       0.7964     981.5028
230    1790.8670       1.1300    1888.4367
235    6709.8869       2.1856    6809.2329
240*************************************************
245    6709.8869       2.1856    6809.2329
250    1790.8670       1.1300    1888.4367
255     886.2690       0.7964     981.5028
260     575.0682       0.6418     668.2142
265     434.8132       0.5611     526.8569
270     360.8862       0.5172     453.2501
275     317.4248       0.4943     411.6621
280     289.5505       0.4847     387.1519
285     270.2575       0.4836     372.5667
290     255.9296       0.4885     364.1226
295     244.5629       0.4973     359.6575
300     234.9823       0.5090     357.8568
305     226.4671       0.5226     357.8801
310     218.5592       0.5375     359.1668
315     210.9596       0.5532     361.3299
320     203.4699       0.5694     364.0940
325     195.9574       0.5858     367.2581
330     188.3343       0.6021     370.6723
335     180.5437       0.6182     374.2229
340     172.5520       0.6339     377.8219
345     164.3425       0.6491     381.4004
350     155.9120       0.6637     384.9041
355     147.2688       0.6776     388.2893
360     138.4316       0.6907     391.5207
TT0 -- STOP --END OF BCAS PROGRAM--
>
```

```
.RUN DX1:SINGLE
  ENTER NUMBER OF MEASUREMENTS -->4
CHOOSE THE FOLLOWING MEASUREMENTS BY NUMBER:
1..RHO10
2..RHO1T
3..ALF10
4..ALFD1
5..TAU1
6..RHOOT
7..BETA

 ENTER NUMBERS -->1,3,4,5
 1
 3
 4
 5
 SIGMA RHO10 (FT) -->100.
 SIGMA ALF10 (DEG) -->.1768
 SIGMA ALFD1 (DEG) -->.25
 SIGMA DTOA1 (FT) -->100.
INPUT RADAR (2) POSITION RELATIVE TO RADAR (1)
 DISTANCE(NM), BEARING(DEG) AND HEIGHT(FT) -->20.
VECTOR RHOV12 -->        20.000    0.000     0.000

INPUT (OWN) POSITION RELATIVE TO RADAR (1)
 DISTANCE(NM), BEARING(DEG) AND ALTITUDE(FT) -->20.,60.
VECTOR RHOV10 -->        10.000    17.321    0.000

INPUT (TARGET) POSITION RELATIVE TO (OWN)
 DISTANCE(NM) AND ALTITUDE(FT) -->8.
 BETA START, INCREMENT (DEG) -->0,5

BETA      RANGE          BEARING       CEP
  0     270.4585         0.8024      732.5005
  5     250.0889         0.8163      736.2923
 10     229.4835         0.8291      739.9138
 15     208.6704         0.8409      743.3139
 20     187.6979         0.8516      746.4505
 25     166.6395         0.8611      749.2886
 30     145.6070         0.8694      751.7996
 35     124.7758         0.8764      753.9603
 40     104.4402         0.8823      755.7519
 45      85.1391         0.8868      757.1599
 50      67.9464         0.8901      758.1732
 55      55.0464         0.8920      758.7842
 60      50.0000         0.8927      758.9884
 65      55.0464         0.8920      758.7842
 70      67.9464         0.8901      758.1732
 75      85.1391         0.8868      757.1599
 80     104.4402         0.8823      755.7519
 85     124.7758         0.8764      753.9603
 90     145.6070         0.8694      751.7996
 95     166.6395         0.8611      749.2886
100     187.6979         0.8516      746.4505
105     208.6704         0.8409      743.3139
110     229.4835         0.8291      739.9138
115     250.0889         0.8163      736.2923
120     270.4585         0.8024      732.5005
125     290.5818         0.7876      728.6003
130     310.4663         0.7718      724.6671
135     330.1391         0.7552      720.7927
140     349.6504         0.7380      717.0900
145     369.0783         0.7200      713.6986
150     388.5370         0.7016      710.7930
155     408.1864         0.6827      708.5929
160     428.2475         0.6636      707.3791
165     449.0237         0.6445      707.5146
170     470.9318         0.6255      709.4769
175     494.5490         0.6069      713.9049
180     520.6852         0.5890      721.6725
185     550.4978         0.5723      734.0049
190     585.6819         0.5572      752.6722
195     628.8021         0.5447      780.3250
200     683.9020         0.5356      821.1142
205     757.7143         0.5319      881.9170
210     862.2906         0.5364      974.9969
215    1021.4507         0.5543     1124.5068
220    1289.3885         0.5966     1385.1850
225    1818.3653         0.6896     1910.1583
230    3213.7210         0.9135     3305.8504
235   10384.1683         1.6737    10480.8022
240*************************************************
245   10384.1683         1.6737    10480.8022
250    3213.7210         0.9135     3305.8504
255    1818.3653         0.6896     1910.1583
260    1289.3885         0.5966     1385.1850
265    1021.4507         0.5543     1124.5068
270     862.2906         0.5364      974.9969
275     757.7143         0.5319      881.9170
280     683.9020         0.5356      821.1142
285     628.8021         0.5447      780.3250
290     585.6819         0.5572      752.6722
295     550.4978         0.5723      734.0049
300     520.6852         0.5890      721.6725
305     494.5490         0.6069      713.9049
310     470.9318         0.6255      709.4769
315     449.0237         0.6445      707.5146
320     428.2475         0.6636      707.3791
325     408.1864         0.6827      708.5929
330     388.5370         0.7016      710.7930
335     369.0783         0.7200      713.6986
340     349.6504         0.7380      717.0900
345     330.1391         0.7552      720.7927
350     310.4663         0.7718      724.6671
355     290.5818         0.7876      728.6003
360     270.4585         0.8024      732.5005
TT0  --  STOP  --END OF BCAS PROGRAM--
>
```

```
:RUN DK1:SINGLE
 ENTER NUMBER OF MEASUREMENTS -->4
 CHOOSE THE FOLLOWING MEASUREMENTS BY NUMBER:
 1..RHO10
 2..RHO1T
 3..ALF10
 4..ALFD1
 5..THU1
 6..RHOOT
 7..BETA

  ENTER NUMBERS -->1,3,4,5
  1
  3
  4
  5
  SIGMA RHO10 (FT) -->100.
  SIGMA ALF10 (DEG) -->.1768
  SIGMA ALFD1 (DEG) -->.25
  SIGMA DTOW1 (FT) -->100.
 INPUT RADAR <2> POSITION RELATIVE TO RADAR <1>
  DISTANCE(NM), BEARING(DEG) AND HEIGHT(FT) -->50.
 VECTOR RHOU12 -->        50.000      0.000      0.000

 INPUT <OWN> POSITION RELATIVE TO RADAR <1>
  DISTANCE(NM), BEARING(DEG) AND ALTITUDE(FT) -->50.,60.
 VECTOR RHOU10 -->        25.000     43.301      0.000

 INPUT <TARGET> POSITION RELATIVE TO <OWN>
  DISTANCE(NM) AND ALTITUDE(FT) -->10.
  BETA START, INCREMENT (DEG) -->0,5

 BETA      RANGE      BEARING      CEP
   0     705.9955     1.4039    1647.7389
   5     645.1455     1.4201    1638.3207
  10     585.1796     1.4351    1630.5135
  15     525.9112     1.4489    1624.0663
  20     467.1999     1.4615    1618.7703
  25     408.9472     1.4727    1614.4523
  30     351.0977     1.4826    1610.9692
  35     293.6499     1.4910    1608.2039
  40     236.6906     1.4979    1606.0621
  45     130.5004     1.5034    1604.4697
  50     125.9420     1.5073    1603.3710
  55      76.4150     1.5096    1602.7270
  60      50.0000     1.5104    1602.5149
  65      76.4150     1.5096    1602.7270
  70     125.9420     1.5073    1603.3710
  75     130.5004     1.5034    1604.4697
  80     236.6906     1.4979    1606.0621
  85     293.6499     1.4910    1608.2039
  90     351.0977     1.4826    1610.9692
  95     408.9472     1.4727    1614.4523
 100     467.1999     1.4615    1618.7703
 105     525.9112     1.4489    1624.0663
 110     525.1796     1.4351    1630.5135
 115     645.1455     1.4201    1638.3207
 120     705.9955     1.4039    1647.7389
 125     767.9690     1.3868    1659.0699
 130     831.3696     1.3687    1672.6774
 135     896.5792     1.3498    1689.0013
 140     964.0769     1.3301    1708.5764
 145    1034.4641     1.3100    1732.0569
 150    1108.4984     1.2894    1760.2497
 155    1187.1384     1.2685    1794.1588
 160    1271.6064     1.2476    1835.0467
 165    1363.4753     1.2267    1884.5214
 170    1464.7926     1.2061    1944.6593
 175    1578.2625     1.1861    2018.1968
 180    1707.5186     1.1669    2108.7532
 185    1857.5475     1.1487    2221.3543
 190    2035.3703     1.1320    2363.0149
 195    2251.1866     1.1172    2543.9363
 200    2520.4007     1.1051    2779.5276
 205    2867.4430     1.0965    3094.2398
 210    3333.5856     1.0932    3529.4046
 215    3994.7019     1.0983    4161.0463
 220    5007.9120     1.1192    5146.6498
 225    6763.3182     1.1754    6877.2274
 230   10588.3273     1.3360   10682.6994
 235   25667.3021     2.0049   25755.2126
 240***********************************************
 245   25667.3021     2.0049   25755.2126
 250   10588.3273     1.3360   10682.6994
 255    6763.3182     1.1754    6877.2274
 260    5007.9120     1.1192    5146.6498
 265    3994.7019     1.0983    4161.0463
 270    3333.5856     1.0932    3529.4046
 275    2867.4430     1.0965    3094.2398
 280    2520.4007     1.1051    2779.5276
 285    2251.1866     1.1172    2543.9363
 290    2035.3703     1.1320    2363.0149
 295    1857.5475     1.1487    2221.3543
 300    1707.5186     1.1669    2108.7532
 305    1578.2625     1.1861    2018.1968
 310    1464.7926     1.2061    1944.6593
 315    1363.4753     1.2267    1884.5214
 320    1271.6064     1.2476    1835.0467
 325    1187.1384     1.2685    1794.1588
 330    1108.4984     1.2894    1760.2497
 335    1034.4641     1.3100    1732.0569
 340     964.0769     1.3301    1708.5764
 345     896.5792     1.3498    1689.0013
 350     831.3696     1.3687    1672.6774
 355     767.9690     1.3868    1659.0699
 360     705.9955     1.4039    1647.7389
TT0  --  STOP  --END OF BCAS PROGRAM--
>
```

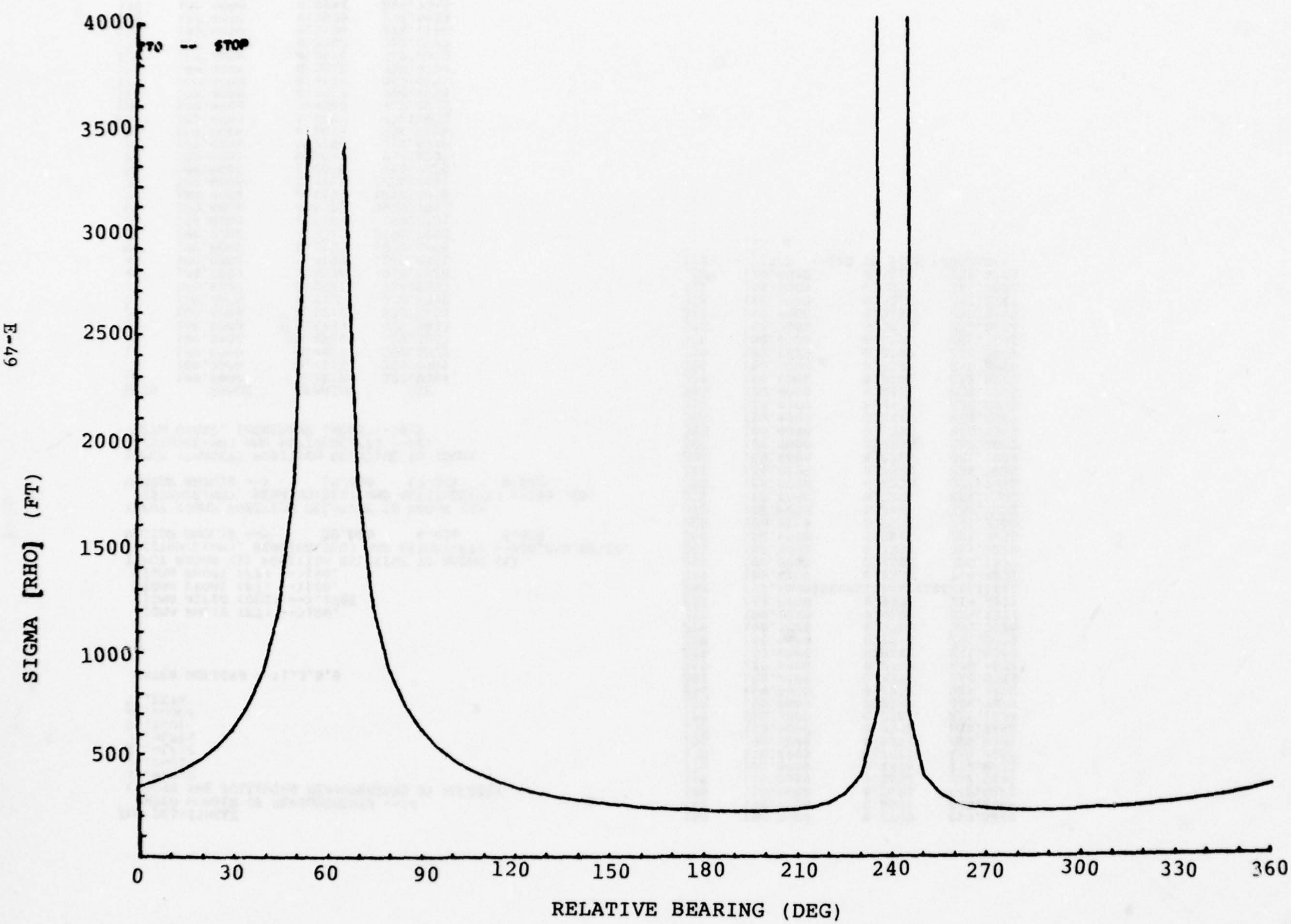
```
RUN DI1:SINGLE
 ENTER NUMBER OF MEASUREMENTS -->4
CHOOSE THE FOLLOWING MEASUREMENTS BY NUMBER:
1..RHO10
2..RHO1T
3..ALF10
4..ALFD1
5..TAU1
6..RHOOT
7..BETA

 ENTER NUMBERS -->1,3,4,5
 1
 3
 4
 5
 SIGMA RHO10 (FT) -->100.
 SIGMA ALF10 (DEG) -->.1768
 SIGMA ALFD1 (DEG) -->.25
 SIGMA DTOA1 (FT) -->100.
INPUT RADAR <2> POSITION RELATIVE TO RADAR <1>
 DISTANCE(NM), BEARING(DEG) AND HEIGHT(FT) -->100.
VECTOR RHOV12 -->      100.000      0.000      0.000

INPUT <OWN> POSITION RELATIVE TO RADAR <1>
 DISTANCE(NM), BEARING(DEG) AND ALTITUDE(FT) -->100.,60.
VECTOR RHOV10 -->      50.000     86.603      0.000

INPUT <TARGET> POSITION RELATIVE TO <OWN>
 DISTANCE(NM) AND ALTITUDE(FT) -->20.
 BETA START, INCREMENT (DEG) -->0,5

BETA     RANGE       BEARING      CEP
  0    1410.3410     1.4033    3293.6309
  5    1288.3108     1.4196    3274.9204
 10    1167.9986     1.4347    3259.4141
 15    1049.0164     1.4486    3246.6124
 20     931.0594     1.4613    3236.0996
 25     813.8935     1.4725    3227.5308
 30     697.3465     1.4824    3220.6208
 35     581.3061     1.4909    3215.1365
 40     465.7329     1.4979    3210.8899
 45     350.7136     1.5033    3207.7334
 50     236.6957     1.5072    3205.5559
 55     126.0033     1.5096    3204.2798
 60      50.0000     1.5104    3203.8595
 65     126.0033     1.5096    3204.2798
 70     236.6957     1.5072    3205.5559
 75     350.7136     1.5033    3207.7334
 80     465.7329     1.4979    3210.8899
 85     581.3061     1.4909    3215.1365
 90     697.3465     1.4824    3220.6208
 95     813.8935     1.4725    3227.5308
100     931.0594     1.4613    3236.0996
105    1049.0164     1.4486    3246.6124
110    1167.9986     1.4347    3259.4141
115    1288.3108     1.4196    3274.9204
120    1410.3410     1.4033    3293.6309
125    1534.5788     1.3860    3316.1461
130    1661.6378     1.3678    3343.1895
135    1792.2855     1.3487    3375.6357
140    1927.4813     1.3289    3414.5475
145    2068.4269     1.3085    3461.2241
150    2216.6329     1.2876    3517.2670
155    2374.0085     1.2663    3584.6669
160    2542.9841     1.2450    3665.9256
165    2726.6830     1.2236    3764.2248
170    2929.1647     1.2023    3883.6679
175    3155.7809     1.1814    4029.6343
180    3413.7074     1.1611    4209.3088
185    3712.7666     1.1416    4432.5028
190    4066.7418     1.1230    4712.9679
195    4495.5719     1.1058    5070.5897
200    5029.2000     1.0901    5535.2389
205    5714.7484     1.0765    6153.9513
210    6630.9535     1.0654    7005.3764
215    7920.2104     1.0578    8231.8461
220    9869.8515     1.0559   10120.7355
225   13162.2385     1.0653   13354.7551
230   19928.9090     1.1076   20066.8924
235   42361.4434     1.3342   42455.8573
240*****************************************
245   42361.4434     1.3342   42455.8573
250   19928.9090     1.1076   20066.8924
255   13162.2385     1.0663   13354.7551
260    9869.8515     1.0559   10120.7355
265    7920.2104     1.0578    8231.8461
270    6630.9535     1.0654    7005.3764
275    5714.7484     1.0765    6153.9513
280    5029.2000     1.0901    5535.2389
285    4495.5719     1.1068    5070.5897
290    4066.7418     1.1230    4712.9679
295    3712.7666     1.1416    4432.5028
300    3413.7074     1.1611    4209.3088
305    3155.7809     1.1814    4029.6343
310    2929.1647     1.2023    3883.6679
315    2726.6830     1.2236    3764.2248
320    2542.9841     1.2450    3665.9256
325    2374.0085     1.2663    3584.6669
330    2216.6329     1.2876    3517.2670
335    2068.4269     1.3085    3461.2241
340    1927.4813     1.3289    3414.5475
345    1792.2855     1.3487    3375.6357
350    1661.6378     1.3678    3343.1895
355    1534.5788     1.3860    3316.1461
360    1410.3410     1.4033    3293.6309
TT0  --  STOP  --END OF BCAS PROGRAM--
>
```



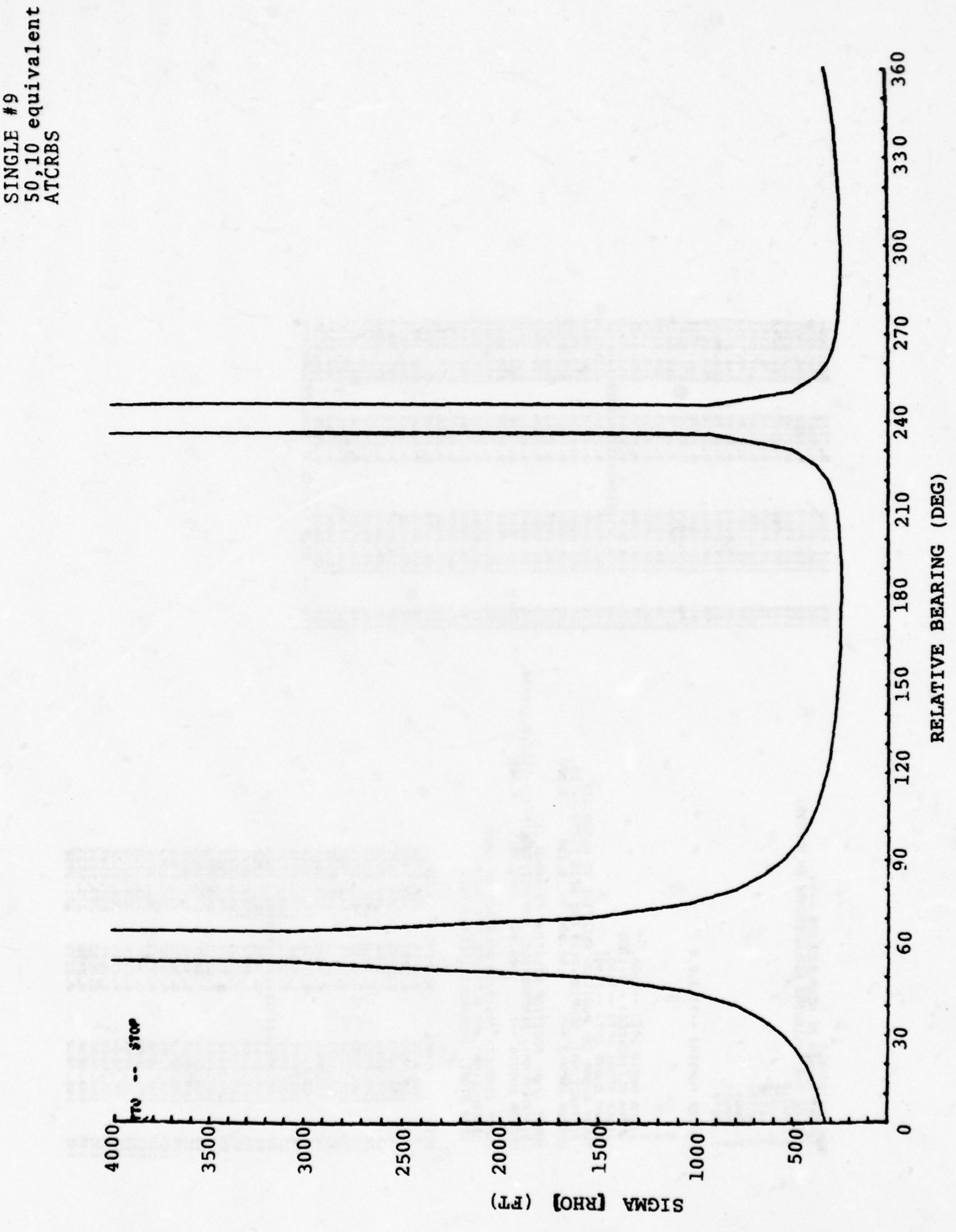
Semi-Act
SINGLE #9
10,5 equivalent
ATCRBS
4000
3500
3000
2500
2000
1500
1000
500
0
30
60
90
120
150
180
210
240
270
300
330
360
SIGMA [RHO] (FT)
RELATIVE BEARING (DEG)

```
RUN DY1:SINGLE
 ENTER NUMBER OF MEASUREMENTS -->4
CHOOSE THE FOLLOWING MEASUREMENTS BY NUMBER:
1..RHO10
2..RHO1T
3..ALF10
4..ALFD1
5..TAU1
6..PHOOT
7..BETA

 ENTER NUMBERS -->1,3,5,6
 1
 3
 5
 6
 SIGMA RHO10 (FT) -->100.
 SIGMA ALF10 (DEG) -->.1768
 SIGMA DTOA1 (FT) -->100.
 SIGMA RHOOT (FT) -->100.
INPUT RADAR (2) POSITION RELATIVE TO RADAR (1)
 DISTANCE(NM), BEARING(DEG) AND HEIGHT(FT) -->10.
VECTOR RHOV12 -->       10.000      0.000      0.000

INPUT (OWN) POSITION RELATIVE TO RADAR (1)
 DISTANCE(NM), BEARING(DEG) AND ALTITUDE(FT) -->10.,60.
VECTOR RHOV10 -->        5.000      8.660      0.000

INPUT (TARGET) POSITION RELATIVE TO (OWN)
 DISTANCE(NM) AND ALTITUDE(FT) -->5.
 BETA START, INCREMENT (DEG) -->0,5

BETA      RANGE       BEARING       CEP
  0     100.0000      0.6086     337.8401
  5     100.0000      0.6630     365.4992
 10     100.0000      0.7284     398.9832
 15     100.0000      0.8085     440.2319
 20     100.0000      0.9088     492.1563
 25     100.0000      1.0379     559.3314
 30     100.0000      1.2101     649.3828
 35     100.0000      1.4514     776.0374
 40     100.0000      1.8134     966.7489
 45     100.0000      2.4172    1285.5761
 50     100.0000      3.6249    1924.6953
 55     100.0000      7.2489    3844.9862
 60     100.0000************************
 65     100.0000      7.2489    3844.9862
 70     100.0000      3.6249    1924.6953
 75     100.0000      2.4172    1285.5761
 80     100.0000      1.8134     966.7489
 85     100.0000      1.4514     776.0374
 90     100.0000      1.2101     649.3828
 95     100.0000      1.0379     559.3314
100     100.0000      0.9088     492.1563
105     100.0000      0.8085     440.2319
110     100.0000      0.7284     398.9832
115     100.0000      0.6630     365.4992
120     100.0000      0.6086     337.8401
125     100.0000      0.5627     314.6638
130     100.0000      0.5234     295.0129
135     100.0000      0.4896     278.1868
140     100.0000      0.4601     263.6620
145     100.0000      0.4343     251.0407
150     100.0000      0.4115     240.0169
155     100.0000      0.3914     230.3531
160     100.0000      0.3735     221.8657
165     100.0000      0.3577     214.4139
170     100.0000      0.3437     207.8935
175     100.0000      0.3315     202.2349
180     100.0000      0.3210     197.4029
185     100.0000      0.3122     193.4028
190     100.0000      0.3053     190.2923
195     100.0000      0.3007     188.2057
200     100.0000      0.2989     187.3997
205     100.0000      0.3010     188.3447
210     100.0000      0.3089     191.9154
215     100.0000      0.3263     199.8282
220     100.0000      0.3606     215.7655
225     100.0000      0.4297     248.8070
230     100.0000      0.5875     327.1926
235     100.0000      1.1045     594.1329
240     100.0000************************
245     100.0000      1.1045     594.1329
250     100.0000      0.5875     327.1926
255     100.0000      0.4297     248.8070
260     100.0000      0.3606     215.7655
265     100.0000      0.3263     199.8282
270     100.0000      0.3089     191.9154
275     100.0000      0.3010     188.3447
280     100.0000      0.2989     187.3997
285     100.0000      0.3007     188.2057
290     100.0000      0.3053     190.2923
295     100.0000      0.3122     193.4028
300     100.0000      0.3210     197.4029
305     100.0000      0.3315     202.2349
310     100.0000      0.3437     207.8935
315     100.0000      0.3577     214.4139
320     100.0000      0.3735     221.8657
325     100.0000      0.3914     230.3531
330     100.0000      0.4115     240.0169
335     100.0000      0.4343     251.0407
340     100.0000      0.4601     263.6620
345     100.0000      0.4896     278.1868
350     100.0000      0.5234     295.0129
355     100.0000      0.5627     314.6638
360     100.0000      0.6086     337.8401
TT0  --  STOP  --END OF BCAS PROGRAM--
>
```

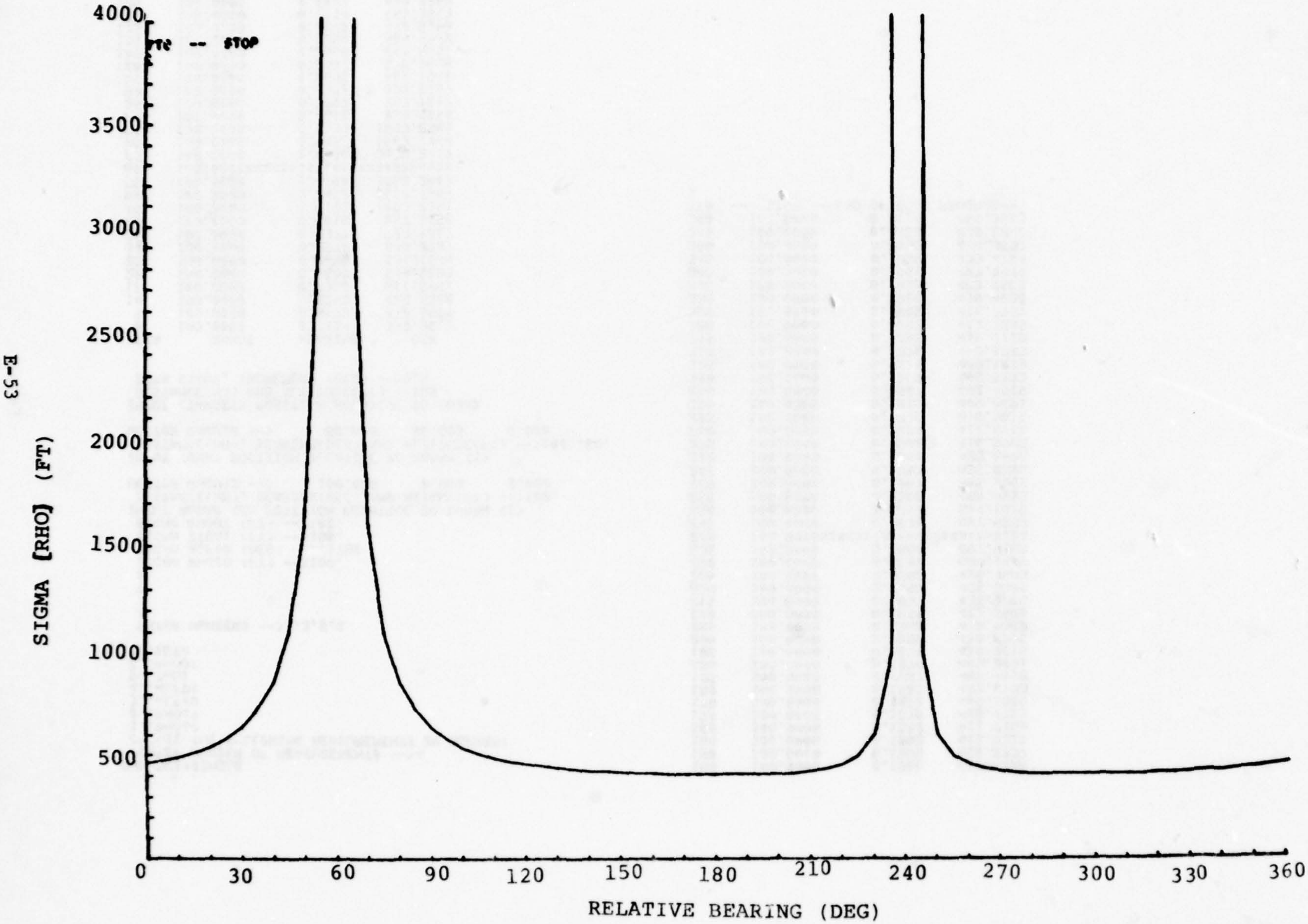
SINGLE #9
ATCRBS
20,8 equivalent



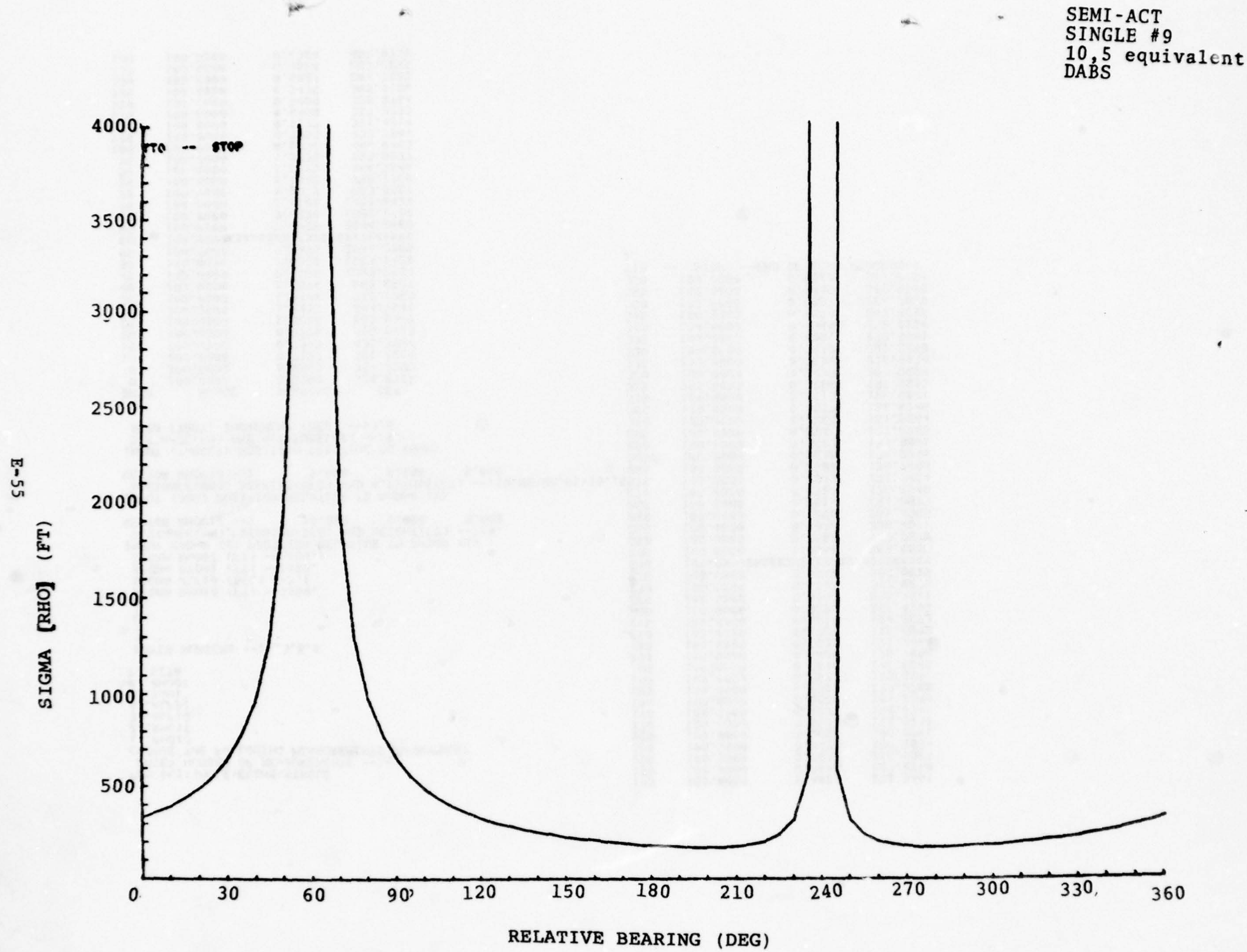
```
RUN DK1:SINGLE
  ENTER NUMBER OF MEASUREMENTS -->4
 CHOOSE THE FOLLOWING MEASUREMENTS BY NUMBER:
 1..RHO10
 2..RHO1T
 3..ALF10
 4..ALF01
 5..TAU1
 6..RHOOT
 7..BETA

 ENTER NUMBERS -->1,3,5,6
 1
 3
 5
 6
 SIGMA RHO10 (FT) -->100.
 SIGMA ALF10 (DEG) -->.1768
 SIGMA DTOA1 (FT) -->100.
 SIGMA RHOOT (FT) -->100.
INPUT RADAR <2> POSITION RELATIVE TO RADAR <1>
 DISTANCE(NM), BEARING(DEG) AND HEIGHT(FT) -->20,0\0,00\20.
VECTOR RHOV12 -->       20.000     0.000     0.000

INPUT <OWN> POSITION RELATIVE TO RADAR <1>
 DISTANCE(NM), BEARING(DEG) AND ALTITUDE(FT) -->20.,60.
VECTOR RHOV10 -->       10.000    17.321     0.000

INPUT <TARGET> POSITION RELATIVE TO <OWN>
 DISTANCE(NM) AND ALTITUDE(FT) -->8.
 BETA START, INCREMENT (DEG) -->0,5

BETA      RANGE       BEARING      CEP
  0     100.0000      0.3818     338.9784
  5     100.0000      0.4114     363.0761
 10     100.0000      0.4474     392.5538
 15     100.0000      0.4920     429.2233
 20     100.0000      0.5483     475.8033
 25     100.0000      0.6214     536.5668
 30     100.0000      0.7196     618.6348
 35     100.0000      0.8581     734.8237
 40     100.0000      1.0670     910.7626
 45     100.0000      1.4169    1206.2461
 50     100.0000      2.1192    1800.6455
 55     100.0000      4.2309    3590.7893
 60     100.0000      0.1768     180.2731
 65     100.0000      4.2309    3590.7893
 70     100.0000      2.1192    1800.6455
 75     100.0000      1.4169    1206.2461
 80     100.0000      1.0670     910.7626
 85     100.0000      0.8581     734.8237
 90     100.0000      0.7196     618.6348
 95     100.0000      0.6214     536.5668
100     100.0000      0.5483     475.8033
105     100.0000      0.4920     429.2233
110     100.0000      0.4474     392.5538
115     100.0000      0.4114     363.0761
120     100.0000      0.3818     338.9784
125     100.0000      0.3571     319.0082
130     100.0000      0.3362     302.2727
135     100.0000      0.3185     288.1195
140     100.0000      0.3033     276.0628
145     100.0000      0.2902     265.7346
150     100.0000      0.2789     256.8540
155     100.0000      0.2691     249.2050
160     100.0000      0.2606     242.6229
165     100.0000      0.2532     236.9845
170     100.0000      0.2470     232.2033
175     100.0000      0.2418     228.2267
180     100.0000      0.2376     225.0385
185     100.0000      0.2345     222.6652
190     100.0000      0.2326     221.1904
195     100.0000      0.2320     220.7825
200     100.0000      0.2333     221.7476
205     100.0000      0.2371     224.6356
210     100.0000      0.2447     230.4632
215     100.0000      0.2588     241.2309
220     100.0000      0.2845     261.2636
225     100.0000      0.3350     301.3220
230     100.0000      0.4506     395.1377
235     100.0000      0.8339     714.4831
240     100.0000*****************************
245     100.0000      0.8339     714.4831
250     100.0000      0.4506     396.1377
255     100.0000      0.3350     301.3220
260     100.0000      0.2845     261.2636
265     100.0000      0.2588     241.2309
270     100.0000      0.2447     230.4632
275     100.0000      0.2371     224.6356
280     100.0000      0.2333     221.7476
285     100.0000      0.2320     220.7825
290     100.0000      0.2326     221.1904
295     100.0000      0.2345     222.6652
300     100.0000      0.2376     225.0385
305     100.0000      0.2418     228.2267
310     100.0000      0.2470     232.2033
315     100.0000      0.2532     236.9845
320     100.0000      0.2606     242.6229
325     100.0000      0.2691     249.2050
330     100.0000      0.2789     256.8540
335     100.0000      0.2902     265.7346
340     100.0000      0.3033     276.0628
345     100.0000      0.3185     288.1195
350     100.0000      0.3362     302.2727
355     100.0000      0.3571     319.0082
360     100.0000      0.3818     338.9784
TT0  --  STOP  --END OF BCAS PROGRAM--
>
```


SINGLE #9
50,10 equivalent
ATCRBS
SIGMA [RHO] (FT)
4000
3500
3000
2500
2000
1500
1000
500
0
30
60
90
120
150
180
210
240
270
300
330
360
RELATIVE BEARING (DEG)

```
RUN DK1:SINGLE
  ENTER NUMBER OF MEASUREMENTS -->4
 CHOOSE THE FOLLOWING MEASUREMENTS BY NUMBER:
 1..RHO10
 2..RHO1T
 3..ALF10
 4..ALFD1
 5..TAU1
 6..RHO0T
 7..BETA

  ENTER NUMBERS -->1,3,5,6
  1
  3
  5
  6
  SIGMA RHO10 (FT) -->100.
  SIGMA ALF10 (DEG) -->.1768
  SIGMA DTOA1 (FT) -->100.
  SIGMA RHO0T (FT) -->100.
 INPUT RADAR (2) POSITION RELATIVE TO RADAR (1)
  DISTANCE(NM), BEARING(DEG) AND HEIGHT(FT) -->50.
 VECTOR RHOV12 -->        50.000      0.000      0.000

 INPUT (OWN) POSITION RELATIVE TO RADAR (1)
  DISTANCE(NM), BEARING(DEG) AND ALTITUDE(FT) -->50.,0.\.0\60.
 VECTOR RHOV10 -->        25.000     43.301      0.000

 INPUT (TARGET) POSITION RELATIVE TO (OWN)
  DISTANCE(NM) AND ALTITUDE(FT) -->10.
  BETA START, INCREMENT (DEG) -->0,5

 BETA      RANGE       BEARING       CEP
   0     100.0000      0.2915     324.8730
   5     100.0000      0.3097     343.3492
  10     100.0000      0.3323     366.3075
  15     100.0000      0.3606     395.2950
  20     100.0000      0.3969     432.6388
  25     100.0000      0.4446     482.0015
  30     100.0000      0.5095     549.4905
  35     100.0000      0.6019     646.0989
  40     100.0000      0.7426     793.8067
  45     100.0000      0.9798    1043.8826
  50     100.0000      1.4586    1550.0941
  55     100.0000      2.9039    3081.1752
  60     100.0000***************************
  65     100.0000      2.9039    3081.1752
  70     100.0000      1.4586    1550.0941
  75     100.0000      0.9798    1043.8826
  80     100.0000      0.7426     793.8067
  85     100.0000      0.6019     646.0989
  90     100.0000      0.5095     549.4906
  95     100.0000      0.4446     482.0015
 100     100.0000      0.3969     432.6388
 105     100.0000      0.3606     395.2950
 110     100.0000      0.3323     366.3075
 115     100.0000      0.3097     343.3492
 120     100.0000      0.2916     324.8730
 125     100.0000      0.2765     309.8134
 130     100.0000      0.2641     297.4147
 135     100.0000      0.2538     287.1294
 140     100.0000      0.2452     278.5533
 145     100.0000      0.2379     271.3852
 150     100.0000      0.2318     265.3994
 155     100.0000      0.2267     260.4279
 160     100.0000      0.2226     256.3487
 165     100.0000      0.2192     253.0788
 170     100.0000      0.2166     250.5712
 175     100.0000      0.2148     248.8151
 180     100.0000      0.2138     247.8411
 185     100.0000      0.2137     247.7333
 190     100.0000      0.2147     248.6509
 195     100.0000      0.2170     250.8695
 200     100.0000      0.2210     254.8578
 205     100.0000      0.2278     261.4281
 210     100.0000      0.2386     272.0507
 215     100.0000      0.2563     289.5681
 220     100.0000      0.2867     320.0185
 225     100.0000      0.3439     378.1528
 230     100.0000      0.4710     509.4455
 235     100.0000      0.8844     943.2510
 240     100.0000***************************
 245     100.0000      0.8844     943.2510
 250     100.0000      0.4710     509.4455
 255     100.0000      0.3439     378.1528
 260     100.0000      0.2867     320.0185
 265     100.0000      0.2563     289.5681
 270     100.0000      0.2386     272.0507
 275     100.0000      0.2278     261.4281
 280     100.0000      0.2210     254.8578
 285     100.0000      0.2170     250.8695
 290     100.0000      0.2147     248.6509
 295     100.0000      0.2137     247.7333
 300     100.0000      0.2138     247.8411
 305     100.0000      0.2148     248.8151
 310     100.0000      0.2166     250.5712
 315     100.0000      0.2192     253.0788
 320     100.0000      0.2226     256.3487
 325     100.0000      0.2267     260.4279
 330     100.0000      0.2318     265.3994
 335     100.0000      0.2379     271.3852
 340     100.0000      0.2452     278.5533
 345     100.0000      0.2538     287.1294
 350     100.0000      0.2641     297.4147
 355     100.0000      0.2765     309.8134
 360     100.0000      0.2915     324.8730
TT0  --  STOP  --END OF BCAS PROGRAM--
>
```

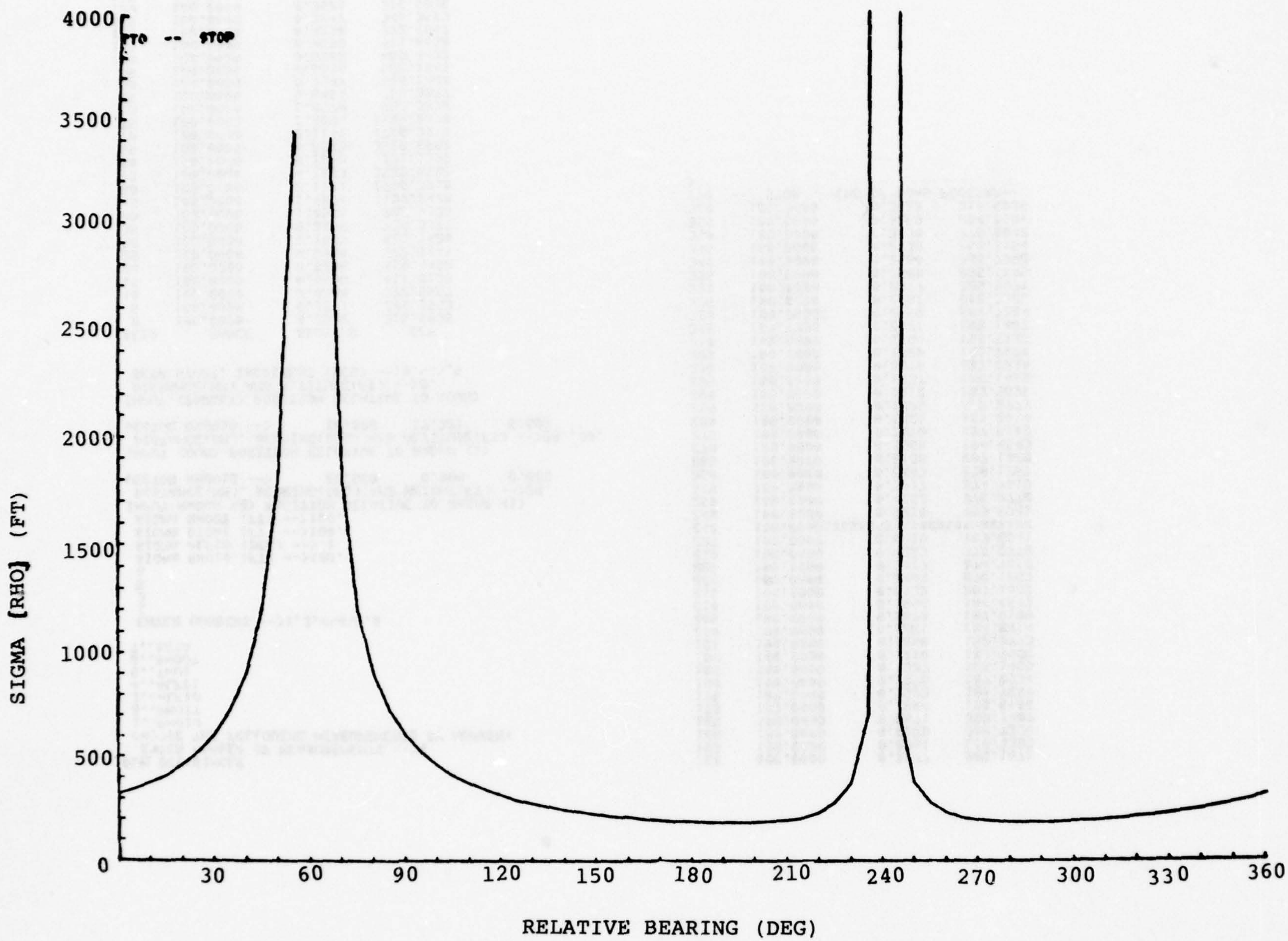

SINGLE #9
100,20 equivalent
ATCRBS
PTC -- STOP
4000
3500
3000
2500
2000
1500
1000
500
SIGMA [RHO] (FT)
0
30
60
90
120
150
180
210
240
270
300
330
360
RELATIVE BEARING (DEG)

```
RUN DC1:SINGLE
  ENTER NUMBER OF MEASUREMENTS -->4
 CHANGE THE FOLLOWING MEASUREMENTS BY NUMBER:
 1..RHO10
 2..RHO1T
 3..ALF10
 4..ALF01
 5..THU1
 6..RHO0T
 7..BETA

  ENTER NUMBERS -->1,3,5,6
  1
  3
  5
  6
  SIGMA RHO10 (FT) -->100.
  SIGMA ALF10 (DEG) -->.1768
  SIGMA DTOA1 (FT) -->100.
  SIGMA RHO0T (FT) -->100.
 INPUT RADAR (2) POSITION RELATIVE TO RADAR (1)
  DISTANCE(NM), BEARING(DEG) AND HEIGHT(FT) -->100.
 VECTOR RHOV12 -->      100.000      0.000      0.000

 INPUT (OWN) POSITION RELATIVE TO RADAR (1)
  DISTANCE(NM), BEARING(DEG) AND ALTITUDE(FT) -->100.,60.
 VECTOR RHOV10 -->       50.000     86.603      0.000

 INPUT (TARGET) POSITION RELATIVE TO (OWN)
  DISTANCE(NM) AND ALTITUDE(FT) -->20.
  BETA START, INCREMENT (DEG) -->0,5

 BETA      RANGE      BEARING       CEP
   0     100.0000     0.2114     459.3513
   5     100.0000     0.2178     472.5990
  10     100.0000     0.2259     489.5328
  15     100.0000     0.2366     511.5851
  20     100.0000     0.2507     540.9598
  25     100.0000     0.2699     581.1941
  30     100.0000     0.2972     638.2797
  35     100.0000     0.3377     723.1217
  40     100.0000     0.4016     857.6656
  45     100.0000     0.5133    1093.2301
  50     100.0000     0.7452    1583.7464
  55     100.0000     1.4600    3098.2417
  60     100.0000**************************
  65     100.0000     1.4600    3098.2417
  70     100.0000     0.7452    1583.7464
  75     100.0000     0.5133    1093.2301
  80     100.0000     0.4016     857.6656
  85     100.0000     0.3377     723.1217
  90     100.0000     0.2972     638.2797
  95     100.0000     0.2699     581.1941
 100     100.0000     0.2507     540.9598
 105     100.0000     0.2366     511.5851
 110     100.0000     0.2259     489.5328
 115     100.0000     0.2178     472.5990
 120     100.0000     0.2114     459.3513
 125     100.0000     0.2063     448.8268
 130     100.0000     0.2022     440.3597
 135     100.0000     0.1989     433.4794
 140     100.0000     0.1961     427.8470
 145     100.0000     0.1939     423.2152
 150     100.0000     0.1920     419.4020
 155     100.0000     0.1905     416.2737
 160     100.0000     0.1893     413.7339
 165     100.0000     0.1883     411.7160
 170     100.0000     0.1876     410.1793
 175     100.0000     0.1870     409.1089
 180     100.0000     0.1867     408.5173
 185     100.0000     0.1867     408.4519
 190     100.0000     0.1870     409.0091
 195     100.0000     0.1876     410.3616
 200     100.0000     0.1888     412.8119
 205     100.0000     0.1908     416.9002
 210     100.0000     0.1941     423.6422
 215     100.0000     0.1997     435.0986
 220     100.0000     0.2097     455.9309
 225     100.0000     0.2302     498.4583
 230     100.0000     0.2809     604.1489
 235     100.0000     0.4680     997.5888
 240     100.0000**************************
 245     100.0000     0.4680     997.5888
 250     100.0000     0.2809     604.1489
 255     100.0000     0.2302     498.4583
 260     100.0000     0.2097     455.9309
 265     100.0000     0.1997     435.0986
 270     100.0000     0.1941     423.6422
 275     100.0000     0.1908     416.9002
 280     100.0000     0.1888     412.8119
 285     100.0000     0.1876     410.3616
 290     100.0000     0.1870     409.0091
 295     100.0000     0.1867     408.4519
 300     100.0000     0.1867     408.5173
 305     100.0000     0.1870     409.1089
 310     100.0000     0.1876     410.1793
 315     100.0000     0.1883     411.7160
 320     100.0000     0.1893     413.7339
 325     100.0000     0.1905     416.2737
 330     100.0000     0.1920     419.4020
 335     100.0000     0.1939     423.2152
 340     100.0000     0.1961     427.8470
 345     100.0000     0.1989     433.4794
 350     100.0000     0.2022     440.3597
 355     100.0000     0.2063     448.8268
 360     100.0000     0.2114     459.3513
TT0  --   STOP  --END OF BCAS PROGRAM--
>
```

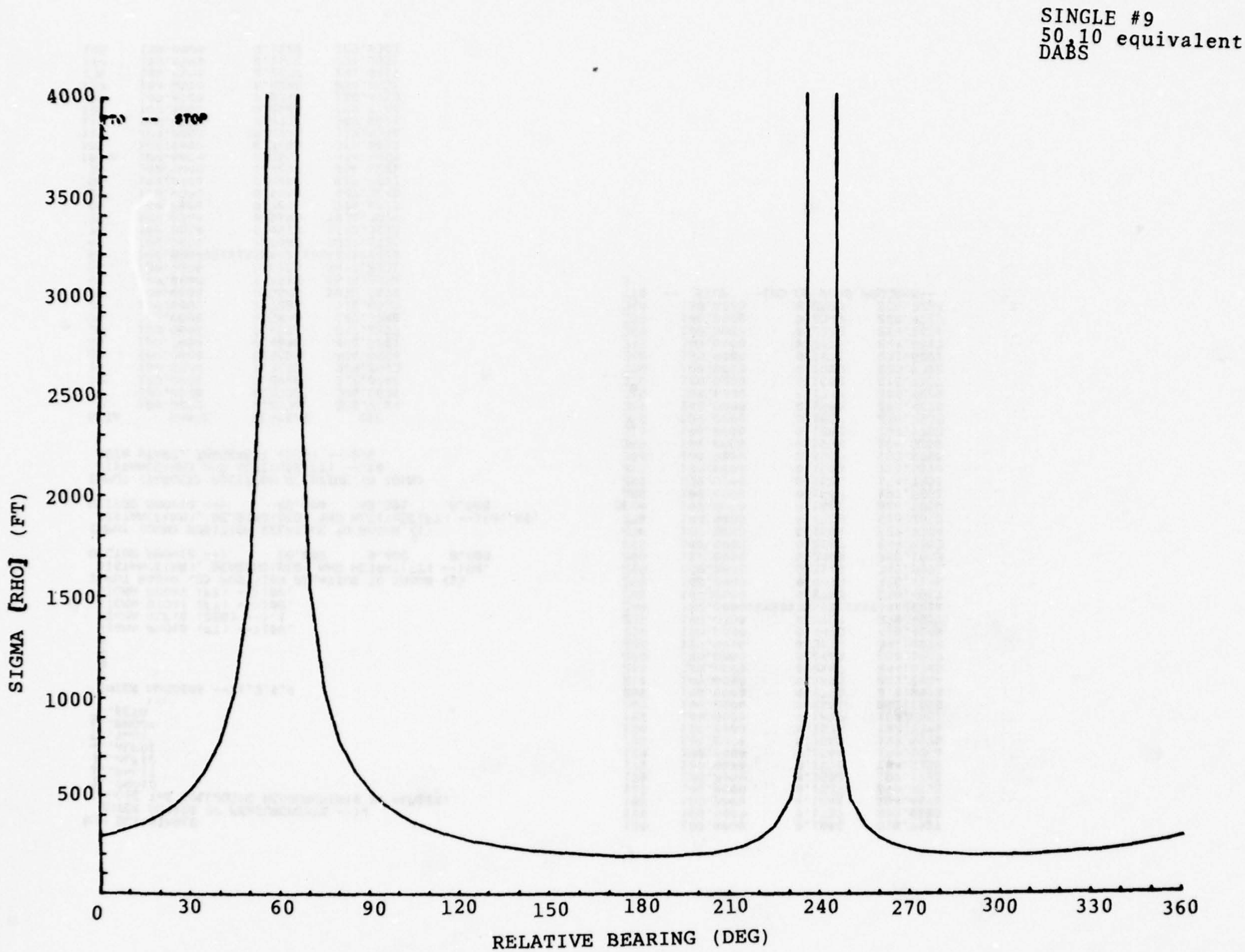

SEMI-ACT
SINGLE #9
10,5 equivalent
DABS
STO -- STOP
4000
3500
3000
2500
2000
1500
1000
500
0
30
60
90
120
150
180
210
240
270
300
330
360
RELATIVE BEARING (DEG)
SIGMA [RHO] (FT)

```
'FUN D.1:SINGLE\ELONS\SINGLE
 ENTER NUMBER OF MEASUREMENTS -->4
CHOOSE THE FOLLOWING MEASUREMENTS BY NUMBER:
1..RHO10
2..RHO1T
3..ALF10
4..ALF21
5..TAU1
6..RHO0T
7..BETA

 ENTER NUMBERS -->1,3,5,6
 1
 3
 5
 6
 SIGMA RHO10 (FT) -->100.
 SIGMA ALF10 (DEG) -->.1
 SIGMA DTOA1 (FT) -->100.
 SIGMA RHO0T (FT) -->100.
INPUT RADAR <2> POSITION RELATIVE TO RADAR <1>
 DISTANCE(NM), BEARING(DEG) AND HEIGHT(FT) -->10.
VECTOR RHOV12 -->       10.000      0.000      0.000

INPUT <OWN> POSITION RELATIVE TO RADAR <1>
 DISTANCE(NM), BEARING(DEG) AND ALTITUDE(FT) -->10.M6\GM.01\10.,6075
VECTOR RHOV10 -->        5.000      8.660      0.000

INPUT <TARGET> POSITION RELATIVE TO <OWN>
 DISTANCE(NM) AND ALTITUDE(FT) -->5.
 BETA START, INCREMENT (DEG) -->0,5

BETA      RANGE       BEARING       CEP
   0    100.0000      0.5909     328.8754
   5    100.0000      0.6468     357.2293
  10    100.0000      0.7137     391.4214
  15    100.0000      0.7953     433.3904
  20    100.0000      0.8970     486.0463
  25    100.0000      1.0276     553.9627
  30    100.0000      1.2013     644.7644
  35    100.0000      1.4440     772.1769
  40    100.0000      1.8076     963.6527
  45    100.0000      2.4128    1283.2494
  50    100.0000      3.6220    1923.1420
  55    100.0000      7.2475    3844.2089
  60    100.0000**************************
  65    100.0000      7.2475    3844.2089
  70    100.0000      3.6220    1923.1420
  75    100.0000      2.4128    1283.2494
  80    100.0000      1.8076     963.6527
  85    100.0000      1.4440     772.1769
  90    100.0000      1.2013     644.7644
  95    100.0000      1.0276     553.9627
 100    100.0000      0.8970     486.0463
 105    100.0000      0.7953     433.3904
 110    100.0000      0.7137     391.4214
 115    100.0000      0.6468     357.2293
 120    100.0000      0.5909     328.8754
 125    100.0000      0.5435     305.0188
 130    100.0000      0.5027     284.7029
 135    100.0000      0.4674     267.2285
 140    100.0000      0.4364     252.0730
 145    100.0000      0.4091     238.8401
 150    100.0000      0.3848     227.2250
 155    100.0000      0.3632     216.9924
 160    100.0000      0.3439     207.9604
 165    100.0000      0.3266     199.9911
 170    100.0000      0.3113     192.9841
 175    100.0000      0.2977     186.8745
 180    100.0000      0.2860     181.6344
 185    100.0000      0.2761     177.2788
 190    100.0000      0.2683     173.8801
 195    100.0000      0.2630     171.5940
 200    100.0000      0.2609     170.7096
 205    100.0000      0.2633     171.7464
 210    100.0000      0.2724     175.6549
 215    100.0000      0.2919     184.2673
 220    100.0000      0.3298     201.4396
 225    100.0000      0.4042     236.4911
 230    100.0000      0.5692     317.9278
 235    100.0000      1.0948     589.0815
 240    100.0000**************************
 245    100.0000      1.0948     589.0815
 250    100.0000      0.5692     317.9278
 255    100.0000      0.4042     236.4911
 260    100.0000      0.3298     201.4395
 265    100.0000      0.2919     184.2673
 270    100.0000      0.2724     175.6549
 275    100.0000      0.2633     171.7464
 280    100.0000      0.2609     170.7096
 285    100.0000      0.2630     171.5940
 290    100.0000      0.2683     173.8801
 295    100.0000      0.2761     177.2788
 300    100.0000      0.2860     181.6344
 305    100.0000      0.2977     186.8746
 310    100.0000      0.3113     192.9841
 315    100.0000      0.3266     199.9911
 320    100.0000      0.3439     207.9604
 325    100.0000      0.3632     216.9924
 330    100.0000      0.3848     227.2250
 335    100.0000      0.4091     238.8401
 340    100.0000      0.4364     252.0730
 345    100.0000      0.4674     267.2285
 350    100.0000      0.5027     284.7029
 355    100.0000      0.5435     305.0188
 360    100.0000      0.5909     328.8754
TT0  --  STOP  --END OF BCAS PROGRAM--
>
```

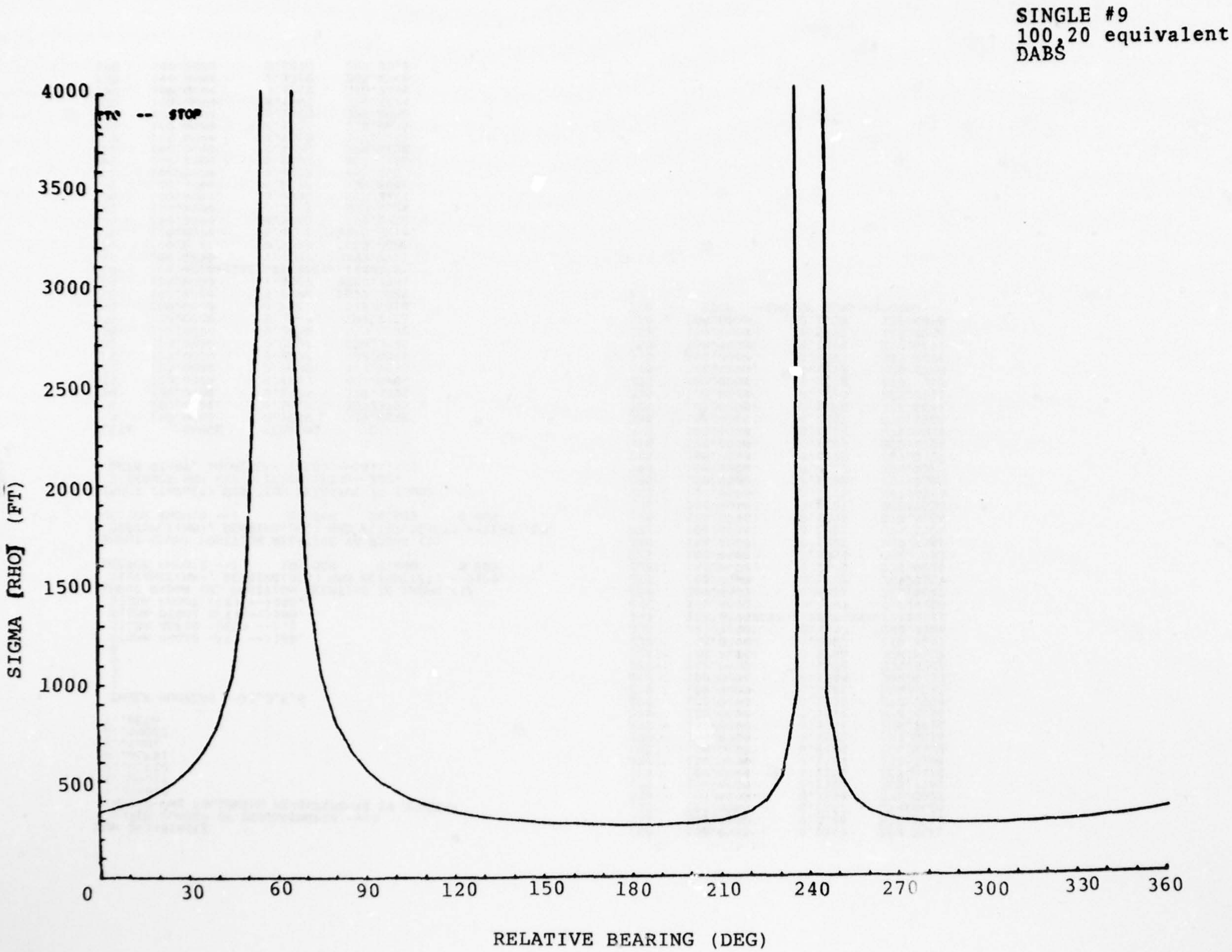
SINGLE #9
20,8 equivalent
DABS



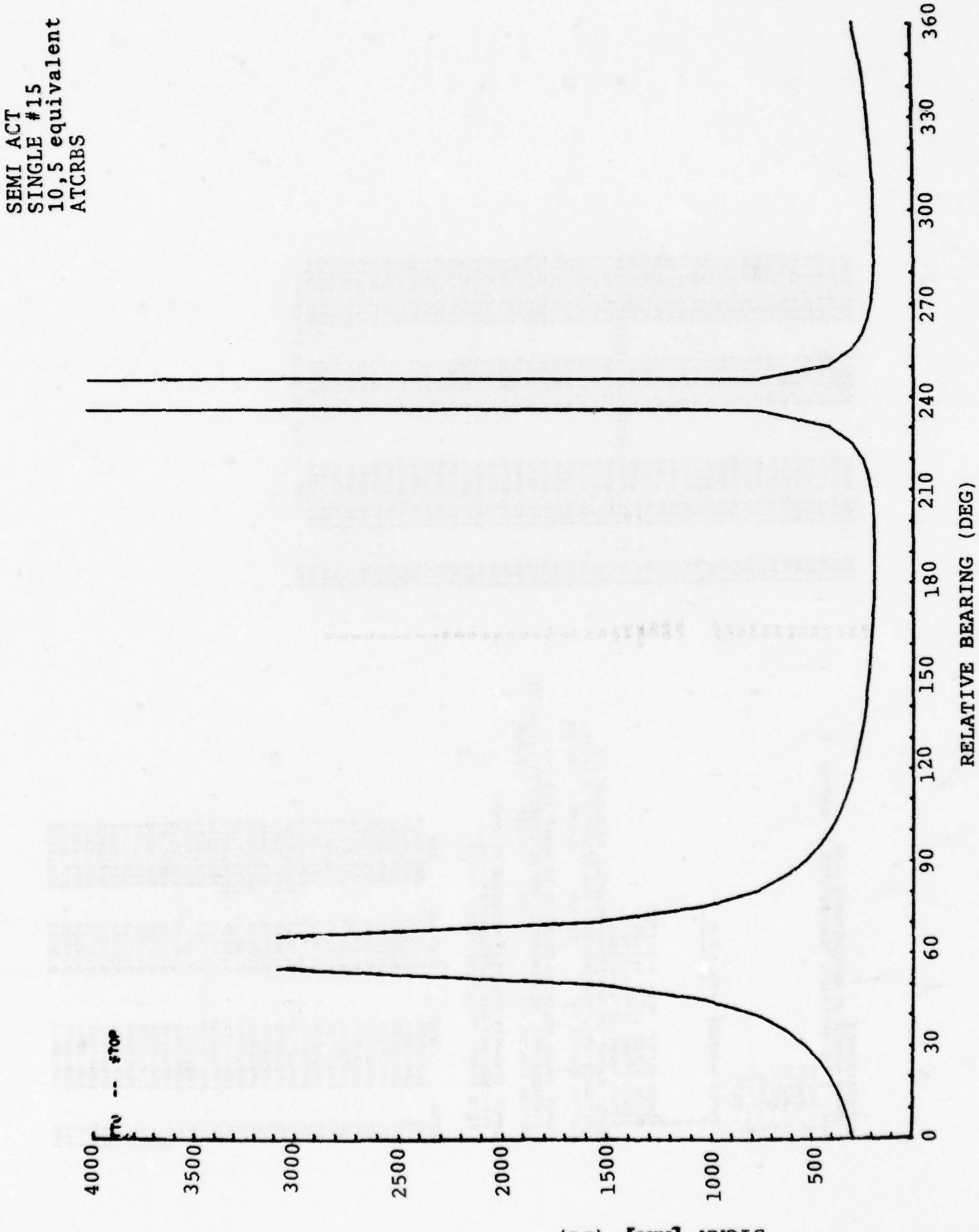
```
RUN DK1:SINGLE
  ENTER NUMBER OF MEASUREMENTS -->4
 CHOOSE THE FOLLOWING MEASUREMENTS BY NUMBER:
 1..RHO10
 2..RHO1T
 3..ALF10
 4..ALF1T
 5..TAU1
 6..RHOOT
 7..BETA

  ENTER NUMBERS -->1,3,4\4\5,6
  1
  3
  5
  6
  SIGMA RHO10 (FT) -->100.
  SIGMA ALF10 (DEG) -->.1
  SIGMA DTOW1 (FT) -->100.
  SIGMA RHOOT (FT) -->100.
 INPUT RADAR (2) POSITION RELATIVE TO RADAR (1)
  DISTANCE(NM), BEARING(DEG) AND HEIGHT(FT) -->20.
 VECTOR RHOU12 -->       20.000      0.000      0.000

 INPUT (OWN) POSITION RELATIVE TO RADAR (1)
  DISTANCE(NM), BEARING(DEG) AND ALTITUDE(FT) -->20.,60.
 VECTOR RHOU10 -->       10.000     17.321      0.000

 INPUT (TARGET) POSITION RELATIVE TO (OWN)
  DISTANCE(NM) AND ALTITUDE(FT) -->8.
  BETA START, INCREMENT (DEG) -->0.\.\,5

BETA     RANGE        BEARING       CEP
  0     100.0000      0.3528     315.6035
  5     100.0000      0.3847     341.3553
 10     100.0000      0.4230     372.5557
 15     100.0000      0.4699     411.0132
 20     100.0000      0.5286     459.4432
 25     100.0000      0.6040     522.1141
 30     100.0000      0.7047     606.1420
 35     100.0000      0.8456     724.3377
 40     100.0000      1.0570     902.3236
 45     100.0000      1.4094    1199.8870
 50     100.0000      2.1141    1796.3918
 55     100.0000      4.2283    3588.6582
 60     100.0000      0.1000     131.1396
 65     100.0000      4.2283    3588.6582
 70     100.0000      2.1141    1796.3918
 75     100.0000      1.4094    1199.8870
 80     100.0000      1.0570     902.3236
 85     100.0000      0.8456     724.3377
 90     100.0000      0.7047     606.1420
 95     100.0000      0.6040     522.1141
100     100.0000      0.5286     459.4432
105     100.0000      0.4699     411.0132
110     100.0000      0.4230     372.5557
115     100.0000      0.3847     341.3553
120     100.0000      0.3528     315.6035
125     100.0000      0.3259     294.0501
130     100.0000      0.3030     275.8042
135     100.0000      0.2832     260.2154
140     100.0000      0.2660     246.7992
145     100.0000      0.2509     235.1895
150     100.0000      0.2377     225.1071
155     100.0000      0.2261     216.3385
160     100.0000      0.2159     208.7224
165     100.0000      0.2071     202.1407
170     100.0000      0.1994     196.5135
175     100.0000      0.1929     191.7984
180     100.0000      0.1876     187.9934
185     100.0000      0.1837     185.1459
190     100.0000      0.1812     183.3695
195     100.0000      0.1806     182.8773
200     100.0000      0.1821     184.0414
205     100.0000      0.1870     187.5109
210     100.0000      0.1966     194.4543
215     100.0000      0.2138     207.1028
220     100.0000      0.2443     230.1267
225     100.0000      0.3017     274.7619
230     100.0000      0.4263     375.2772
235     100.0000      0.8210     703.6941
240     100.0000*******************************
245     100.0000      0.8210     703.6941
250     100.0000      0.4263     375.2772
255     100.0000      0.3017     274.7619
260     100.0000      0.2443     230.1257
265     100.0000      0.2138     207.1028
270     100.0000      0.1966     194.4543
275     100.0000      0.1870     187.5109
280     100.0000      0.1821     184.0414
285     100.0000      0.1806     182.8773
290     100.0000      0.1812     183.3695
295     100.0000      0.1837     185.1459
300     100.0000      0.1876     187.9934
305     100.0000      0.1929     191.7984
310     100.0000      0.1994     196.5135
315     100.0000      0.2071     202.1407
320     100.0000      0.2159     208.7224
325     100.0000      0.2261     216.3385
330     100.0000      0.2377     225.1071
335     100.0000      0.2509     235.1895
340     100.0000      0.2660     246.7992
345     100.0000      0.2832     260.2154
350     100.0000      0.3030     275.8042
355     100.0000      0.3259     294.0501
360     100.0000      0.3528     315.6035
TT0  --  STOP  --END OF BCAS PROGRAM--
>
```


SINGLE #9
50,10 equivalent
DABS
SIGMA [RHO] (FT)
RELATIVE BEARING (DEG)
STOP
4000
3500
3000
2500
2000
1500
1000
500
0
30
60
90
120
150
180
210
240
270
300
330
360

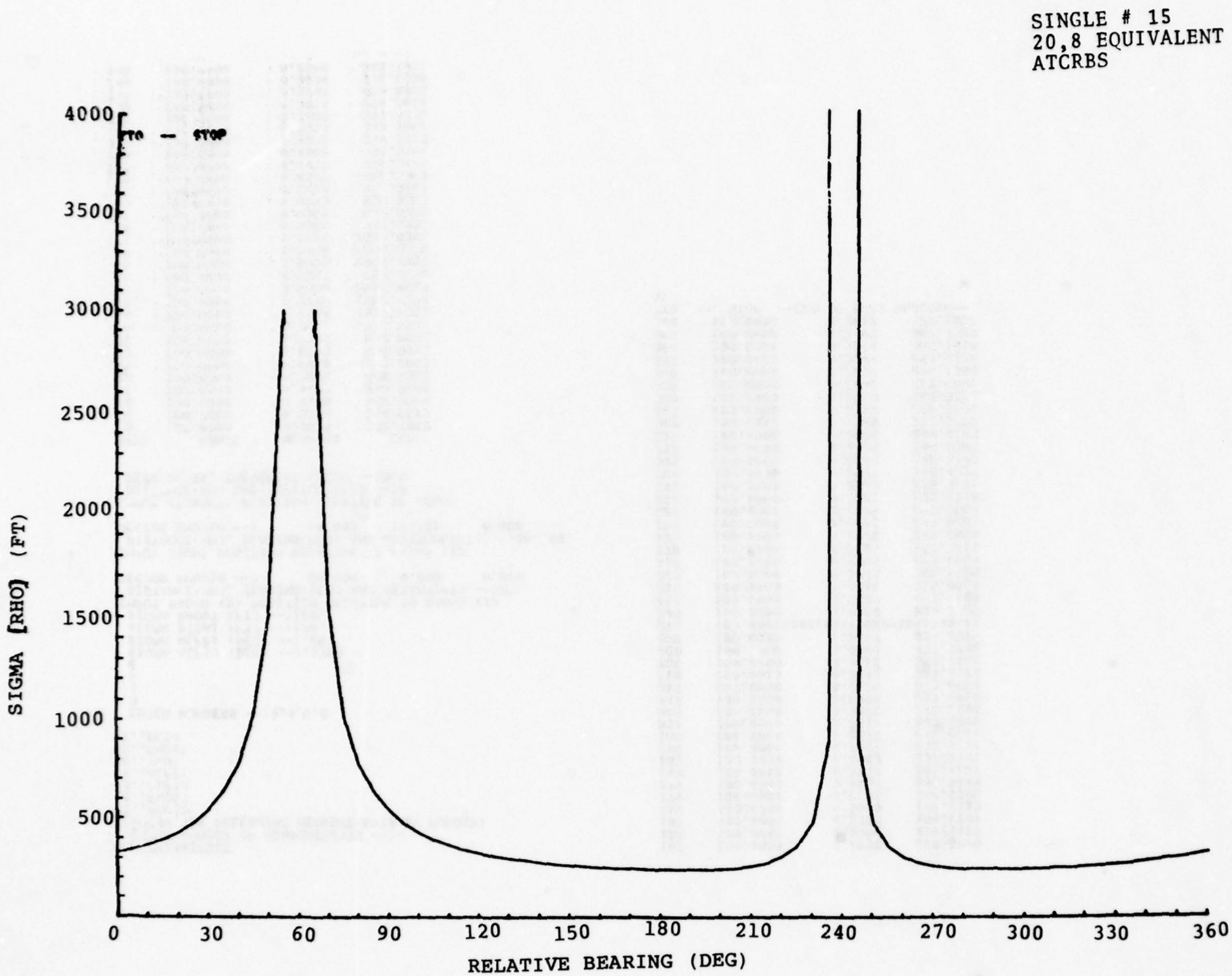
```
RUN DK1:SINGLE
  ENTER NUMBER OF MEASUREMENTS -->4
 CHOOSE THE FOLLOWING MEASUREMENTS BY NUMBER:
 1..PHO10
 2..PHO1T
 3..ALF10
 4..ALF01
 5..THU1
 6..RHOOT
 7..BETA

  ENTER NUMBERS -->1,3,5,6
  1
  3
  5
  6
  SIGMA PHO10 (FT) -->100.
  SIGMA ALF10 (DEG) -->.1
  SIGMA DTOW1 (FT) -->100.
  SIGMA RHOOT (FT) -->100.
 INPUT RADAR <2> POSITION RELATIVE TO RADAR <1>
  DISTANCE(NM), BEARING(DEG) AND HEIGHT(FT) -->50.
 VECTOR RHOV12 -->        50.000     0.000      0.000

 INPUT <OWN> POSITION RELATIVE TO RADAR <1>
  DISTANCE(NM), BEARING(DEG) AND ALTITUDE(FT) -->50.,60.
 VECTOR RHOV10 -->        25.000    43.301      0.000

 INPUT <TARGET> POSITION RELATIVE TO <OWN>
  DISTANCE(NM) AND ALTITUDE(FT) -->10.
  BETA START, INCREMENT (DEG) -->0,5


 BETA      RANGE        BEARING       CEP
   0    100.0000        0.2524    285.7184
   5    100.0000        0.2733    306.5635
  10    100.0000        0.2986    332.0748
  15    100.0000        0.3298    363.8003
  20    100.0000        0.3692    404.0654
  25    100.0000        0.4200    456.5281
  30    100.0000        0.4882    527.2877
  35    100.0000        0.5840    627.3248
  40    100.0000        0.7281    778.6023
  45    100.0000        0.9689   1032.3679
  50    100.0000        1.4513   1542.3632
  55    100.0000        2.9003   3077.2931
  60    100.0000*****************************
  65    100.0000        2.9003   3077.2931
  70    100.0000        1.4513   1542.3632
  75    100.0000        0.9689   1032.3679
  80    100.0000        0.7281    778.6023
  85    100.0000        0.5840    627.3248
  90    100.0000        0.4882    527.2877
  95    100.0000        0.4200    456.5281
 100    100.0000        0.3692    404.0654
 105    100.0000        0.3298    363.8003
 110    100.0000        0.2986    332.0748
 115    100.0000        0.2733    306.5635
 120    100.0000        0.2524    285.7184
 125    100.0000        0.2349    268.4713
 130    100.0000        0.2202    254.0631
 135    100.0000        0.2077    241.9417
 140    100.0000        0.1971    231.6991
 145    100.0000        0.1880    223.0302
 150    100.0000        0.1802    215.7067
 155    100.0000        0.1737    209.5595
 160    100.0000        0.1682    204.4679
 165    100.0000        0.1637    200.3532
 170    100.0000        0.1602    197.1762
 175    100.0000        0.1578    194.9396
 180    100.0000        0.1564    193.6950
 185    100.0000        0.1563    193.5570
 190    100.0000        0.1576    194.7301
 195    100.0000        0.1607    197.5551
 200    100.0000        0.1661    202.5956
 205    100.0000        0.1750    210.8012
 210    100.0000        0.1888    223.8394
 215    100.0000        0.2107    244.8309
 220    100.0000        0.2468    280.1863
 225    100.0000        0.3115    345.0972
 230    100.0000        0.4479    485.4145
 235    100.0000        0.8723    930.4917
 240    100.0000*****************************
 245    100.0000        0.8723    930.4917
 250    100.0000        0.4479    485.4145
 255    100.0000        0.3115    345.0972
 260    100.0000        0.2468    280.1863
 265    100.0000        0.2107    244.8309
 270    100.0000        0.1888    223.8394
 275    100.0000        0.1750    210.8012
 280    100.0000        0.1661    202.5956
 285    100.0000        0.1607    197.5551
 290    100.0000        0.1576    194.7301
 295    100.0000        0.1563    193.5570
 300    100.0000        0.1564    193.6950
 305    100.0000        0.1578    194.9396
 310    100.0000        0.1602    197.1762
 315    100.0000        0.1637    200.3532
 320    100.0000        0.1682    204.4679
 325    100.0000        0.1737    209.5595
 330    100.0000        0.1802    215.7067
 335    100.0000        0.1880    223.0302
 340    100.0000        0.1971    231.6991
 345    100.0000        0.2077    241.9417
 350    100.0000        0.2202    254.0631
 355    100.0000        0.2349    268.4713
 360    100.0000        0.2524    285.7184
TT0  --  STOP  --END OF BCAS PROGRAM--
>
```


SINGLE #9
100,20 equivalent
DABS
FTC -- STOP
SIGMA [RHO] (FT)
4000
3500
3000
2500
2000
1500
1000
500
0
30
60
90
120
150
180
210
240
270
300
330
360
RELATIVE BEARING (DEG)

```
RUN DK1:SINGLE
 ENTER NUMBER OF MEASUREMENTS -->4
 CHOOSE THE FOLLOWING MEASUREMENTS BY NUMBER:
 1..RHO10
 2..RHO1T
 3..ALF10
 4..ALFD1
 5..TAU1
 6..RHOOT
 7..BETA

 ENTER NUMBERS -->1,3,5,6
 1
 3
 5
 6
 SIGMA RHO10 (FT) -->100.
 SIGMA ALF10 (DEG) -->.1
 SIGMA DTOW1 (FT) -->100.
 SIGMA RHOOT (FT) -->100.
INPUT RADAR <2> POSITION RELATIVE TO RADAR <1>
 DISTANCE(NM), BEARING(DEG) AND HEIGHT(FT) -->100.
VECTOR RHOU12 -->       100.000      0.000      0.000

INPUT <OWN> POSITION RELATIVE TO RADAR <1>
 DISTANCE(NM), BEARING(DEG) AND ALTITUDE(FT) -->100.,60.
VECTOR RHOU10 -->        50.000     86.603      0.000

INPUT <TARGET> POSITION RELATIVE TO <OWN>
 DISTANCE(NM) AND ALTITUDE(FT) -->20.
 BETA START, INCREMENT (DEG) -->0.\.\,5

BETA      RANGE      BEARING       CEP
  0     100.0000     0.1530     339.6670
  5     100.0000     0.1618     357.3791
 10     100.0000     0.1726     379.4896
 15     100.0000     0.1863     407.5405
 20     100.0000     0.2039     443.8553
 25     100.0000     0.2272     492.0941
 30     100.0000     0.2590     558.3645
 35     100.0000     0.3046     653.6628
 40     100.0000     0.3742     799.9752
 45     100.0000     0.4921    1048.5810
 50     100.0000     0.7308    1553.2620
 55     100.0000     1.4527    3082.7701
 60     100.0000***************************
 65     100.0000     1.4527    3082.7701
 70     100.0000     0.7308    1553.2620
 75     100.0000     0.4921    1048.5810
 80     100.0000     0.3742     799.9752
 85     100.0000     0.3046     653.6628
 90     100.0000     0.2590     558.3645
 95     100.0000     0.2272     492.0941
100     100.0000     0.2039     443.8553
105     100.0000     0.1863     407.5405
110     100.0000     0.1726     379.4896
115     100.0000     0.1618     357.3791
120     100.0000     0.1530     339.6670
125     100.0000     0.1459     325.2930
130     100.0000     0.1401     313.5071
135     100.0000     0.1352     303.7671
140     100.0000     0.1312     295.6740
145     100.0000     0.1278     288.9310
150     100.0000     0.1250     283.3161
155     100.0000     0.1226     278.6644
160     100.0000     0.1207     274.8560
165     100.0000     0.1192     271.8089
170     100.0000     0.1180     269.4756
175     100.0000     0.1172     267.8435
180     100.0000     0.1167     266.9390
185     100.0000     0.1166     266.8389
190     100.0000     0.1171     267.6910
195     100.0000     0.1181     269.7530
200     100.0000     0.1200     273.4660
205     100.0000     0.1231     279.5994
210     100.0000     0.1281     289.5561
215     100.0000     0.1364     306.0733
220     100.0000     0.1508     335.0269
225     100.0000     0.1782     390.9367
230     100.0000     0.2401     519.0047
235     100.0000     0.4447     948.4480
240     100.0000***************************
245     100.0000     0.4447     948.4480
250     100.0000     0.2401     519.0047
255     100.0000     0.1782     390.9367
260     100.0000     0.1508     335.0269
265     100.0000     0.1364     306.0733
270     100.0000     0.1281     289.5561
275     100.0000     0.1231     279.5994
280     100.0000     0.1200     273.4660
285     100.0000     0.1181     269.7530
290     100.0000     0.1171     267.6910
295     100.0000     0.1166     266.8389
300     100.0000     0.1167     266.9390
305     100.0000     0.1172     267.8435
310     100.0000     0.1180     269.4756
315     100.0000     0.1192     271.8089
320     100.0000     0.1207     274.8560
325     100.0000     0.1226     278.6644
330     100.0000     0.1250     283.3161
335     100.0000     0.1278     288.9310
340     100.0000     0.1312     295.6740
345     100.0000     0.1352     303.7671
350     100.0000     0.1401     313.5071
355     100.0000     0.1459     325.2930
360     100.0000     0.1530     339.6670
TT0  --  STOP  --END OF BCAS PROGRAM--
>
```


SEMI ACT
SINGLE #15
10,5 equivalent
ATCRBS
SIGMA [RHO] (FT)
4000
3500
3000
2500
2000
1500
1000
500
RELATIVE BEARING (DEG)
0
30
60
90
120
150
180
210
240
270
300
330
360

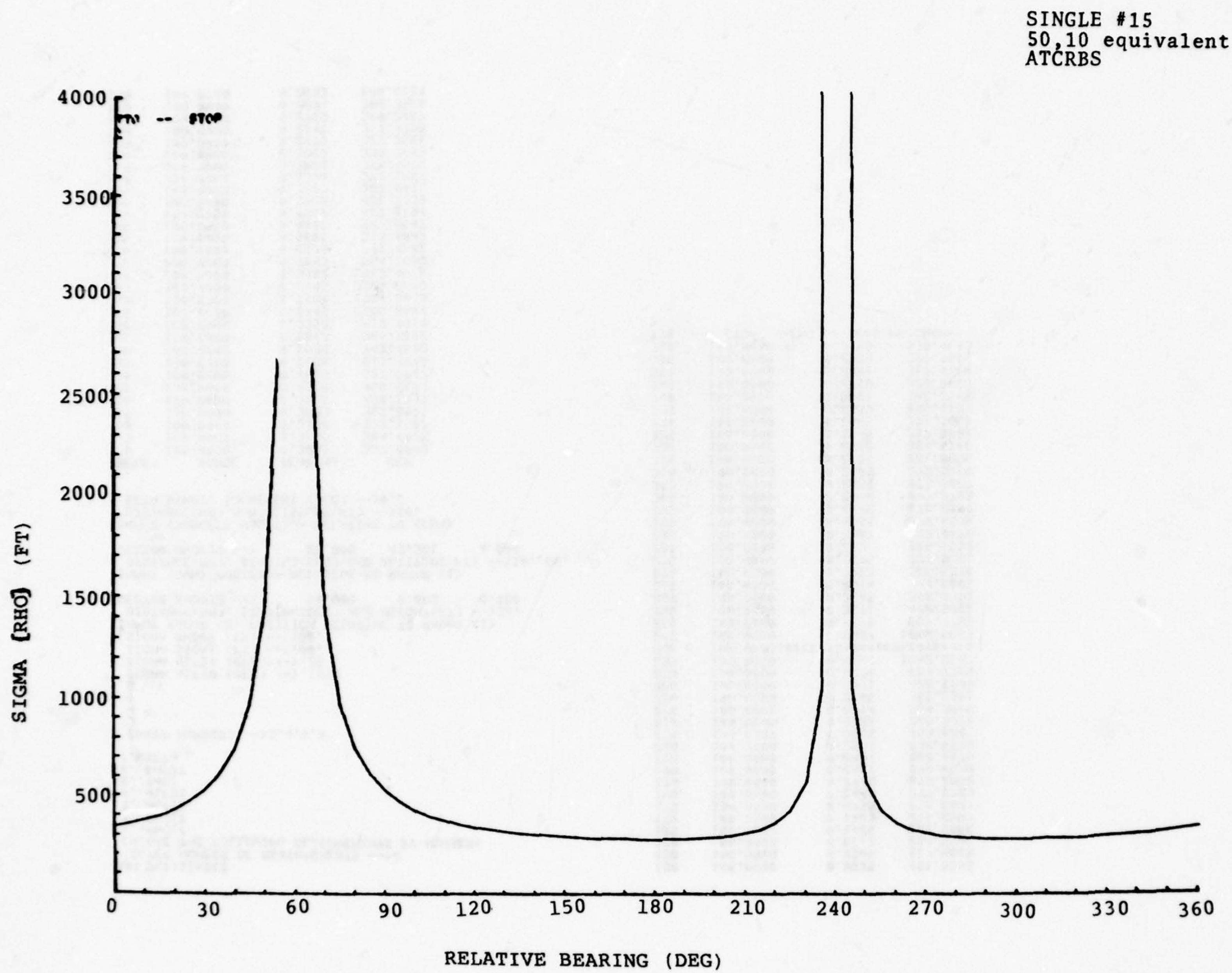
```
RUN DK1:SINGLE
  ENTER NUMBER OF MEASUREMENTS -->4
 CHOOSE THE FOLLOWING MEASUREMENTS BY NUMBER:
 1..RHO1O
 2..RHO1T
 3..ALF1O
 4..ALFD1
 5..TAU1
 6..RHOOT
 7..BETA

  ENTER NUMBERS -->3,4,5,6
  3
  4
  5
  6
  SIGMA ALF10 (DEG) -->.1768
  SIGMA ALFD1 (DEG) -->.25
  SIGMA DTOA1 (FT) -->100.
  SIGMA RHOOT (FT) -->100.
 INPUT RADAR (2) POSITION RELATIVE TO RADAR (1)
  DISTANCE(NM), BEARING(DEG) AND HEIGHT(FT) -->10.
 VECTOR RHOV12 -->          10.000      0.000      0.000

 INPUT (OWN) POSITION RELATIVE TO RADAR (1)
  DISTANCE(NM), BEARING(DEG) AND ALTITUDE(FT) -->10.,60.
 VECTOR RHOV10 -->           5.000      8.660      0.000

 INPUT (TARGET) POSITION RELATIVE TO (OWN)
  DISTANCE(NM) AND ALTITUDE(FT) -->5.
  BETA START, INCREMENT (DEG) -->0,5

 BETA      RANGE       BEARING       CEP
   0     100.0000      0.5170     291.8054
   5     100.0000      0.5583     312.4459
  10     100.0000      0.6083     337.6801
  15     100.0000      0.6700     369.0602
  20     100.0000      0.7478     408.9161
  25     100.0000      0.8485     460.9110
  30     100.0000      0.9838     531.1494
  35     100.0000      1.1743     630.6183
  40     100.0000      1.4613     781.2874
  45     100.0000      1.9417    1034.4114
  50     100.0000      2.9053    1543.7398
  55     100.0000      5.8018    3077.9857
  60     100.0000      0.7706     420.6405
  65     100.0000      5.8018    3077.9657
  70     100.0000      2.9053    1543.7398
  75     100.0000      1.9417    1034.4114
  80     100.0000      1.4613     781.2874
  85     100.0000      1.1743     630.6183
  90     100.0000      0.9838     531.1494
  95     100.0000      0.8485     460.9110
 100     100.0000      0.7478     408.9161
 105     100.0000      0.6700     369.0602
 110     100.0000      0.6083     337.6801
 115     100.0000      0.5583     312.4459
 120     100.0000      0.5170     291.8054
 125     100.0000      0.4825     274.6866
 130     100.0000      0.4533     260.3263
 135     100.0000      0.4284     248.1689
 140     100.0000      0.4069     237.8019
 145     100.0000      0.3883     228.9158
 150     100.0000      0.3723     221.2768
 155     100.0000      0.3583     214.7091
 160     100.0000      0.3463     209.0838
 165     100.0000      0.3360     204.3111
 170     100.0000      0.3274     200.3376
 175     100.0000      0.3204     197.1465
 180     100.0000      0.3152     194.7622
 185     100.0000      0.3119     193.2605
 190     100.0000      0.3109     192.7894
 195     100.0000      0.3126     193.6051
 200     100.0000      0.3182     196.1402
 205     100.0000      0.3291     201.1350
 210     100.0000      0.3481     209.9079
 215     100.0000      0.3800     224.9617
 220     100.0000      0.4352     251.5132
 225     100.0000      0.5376     302.0838
 230     100.0000      0.7592     414.7813
 235     100.0000      1.4603     780.7624
 240     100.0000**************************
 245     100.0000      1.4603     780.7624
 250     100.0000      0.7592     414.7813
 255     100.0000      0.5376     302.0838
 260     100.0000      0.4352     251.5132
 265     100.0000      0.3800     224.9617
 270     100.0000      0.3481     209.9079
 275     100.0000      0.3291     201.1350
 280     100.0000      0.3182     196.1402
 285     100.0000      0.3126     193.6051
 290     100.0000      0.3109     192.7894
 295     100.0000      0.3119     193.2605
 300     100.0000      0.3152     194.7622
 305     100.0000      0.3204     197.1465
 310     100.0000      0.3274     200.3376
 315     100.0000      0.3360     204.3111
 320     100.0000      0.3463     209.0838
 325     100.0000      0.3583     214.7091
 330     100.0000      0.3723     221.2768
 335     100.0000      0.3883     228.9158
 340     100.0000      0.4069     237.8019
 345     100.0000      0.4284     248.1689
 350     100.0000      0.4533     260.3263
 355     100.0000      0.4825     274.6866
 360     100.0000      0.5170     291.8054
TT0  --   STOP  --END OF BCAS PROGRAM--
>
```


SINGLE # 15
20,8 EQUIVALENT
ATCRBS
4000
3500
3000
2500
2000
1500
1000
500
SIGMA [RHO] (FT)
0
30
60
90
120
150
180
210
240
270
300
330
360
RELATIVE BEARING (DEG)

```
RUN DK1:SINGLE
 ENTER NUMBER OF MEASUREMENTS -->4
CHOOSE THE FOLLOWING MEASUREMENTS BY NUMBER:
1..PHAI0
2..PHAIT
3..ALFI0
4..ALFD1
5..TAU1
6..RHOOT
7..BETA

 ENTER NUMBERS -->3,4,5,6
 3
 4
 5
 6
 SIGMA ALFI0 (DEG) -->.1768
 SIGMA ALFD1 (DEG) -->.25
 SIGMA DTAU1 (FT) -->100.
 SIGMA RHOOT (FT) -->100.
INPUT RADAR <2> POSITION RELATIVE TO RADAR <1>
 DISTANCE(NM), BEARING(DEG) AND HEIGHT(FT) -->20.
VECTOR RHOV12 -->        20.000      0.000      0.000

INPUT <OWN> POSITION RELATIVE TO RADAR <1>
 DISTANCE(NM), BEARING(DEG) AND ALTITUDE(FT) -->20.,60.
VECTOR RHOV10 -->        10.000     17.321      0.000

INPUT <TARGET> POSITION RELATIVE TO <OWN>
 DISTANCE(NM) AND ALTITUDE(FT) -->8.
 BETA START, INCREMENT (DEG) -->0,5
```

BETA	RANGE	BEARING	CEP
0	100.0000	0.3610	322.1852
5	100.0000	0.3832	340.1513
10	100.0000	0.4105	362.3704
15	100.0000	0.4447	390.3446
20	100.0000	0.4885	426.3358
25	100.0000	0.5460	473.9057
30	100.0000	0.6243	538.9953
35	100.0000	0.7359	632.2982
40	100.0000	0.9061	775.1925
45	100.0000	1.1936	1017.5351
50	100.0000	1.7746	1508.8376
55	100.0000	3.5300	2996.4987
60	100.0000	0.8927	763.9132
65	100.0000	3.5300	2996.4987
70	100.0000	1.7746	1508.8376
75	100.0000	1.1936	1017.5351
80	100.0000	0.9061	775.1925
85	100.0000	0.7359	632.2982
90	100.0000	0.6243	538.9953
95	100.0000	0.5460	473.9057
100	100.0000	0.4885	426.3358
105	100.0000	0.4447	390.3446
110	100.0000	0.4105	362.3704
115	100.0000	0.3832	340.1513
120	100.0000	0.3610	322.1852
125	100.0000	0.3427	307.4389
130	100.0000	0.3274	295.1810
135	100.0000	0.3144	284.8826
140	100.0000	0.3034	276.1550
145	100.0000	0.2940	268.7091
150	100.0000	0.2859	262.3296
155	100.0000	0.2789	256.8575
160	100.0000	0.2729	252.1790
165	100.0000	0.2678	248.2183
170	100.0000	0.2635	244.9349
175	100.0000	0.2602	242.3243
180	100.0000	0.2577	240.4227
185	100.0000	0.2563	239.3181
190	100.0000	0.2561	239.1718
195	100.0000	0.2575	240.2564
200	100.0000	0.2611	243.0285
205	100.0000	0.2678	248.2698
210	100.0000	0.2795	257.3819
215	100.0000	0.2995	273.0554
220	100.0000	0.3346	300.9786
225	100.0000	0.4015	355.0068
230	100.0000	0.5507	477.7898
235	100.0000	1.0357	884.3385
240	100.0000	**********	**********
245	100.0000	1.0357	884.3385
250	100.0000	0.5507	477.7898
255	100.0000	0.4015	355.0068
260	100.0000	0.3346	300.9786
265	100.0000	0.2995	273.0554
270	100.0000	0.2795	257.3819
275	100.0000	0.2678	248.2698
280	100.0000	0.2611	243.0285
285	100.0000	0.2575	240.2564
290	100.0000	0.2561	239.1718
295	100.0000	0.2563	239.3181
300	100.0000	0.2577	240.4227
305	100.0000	0.2602	242.3243
310	100.0000	0.2635	244.9349
315	100.0000	0.2678	248.2183
320	100.0000	0.2729	252.1790
325	100.0000	0.2789	256.8575
330	100.0000	0.2859	262.3296
335	100.0000	0.2940	268.7091
340	100.0000	0.3034	276.1550
345	100.0000	0.3144	284.8826
350	100.0000	0.3274	295.1810
355	100.0000	0.3427	307.4389
360	100.0000	0.3610	322.1852

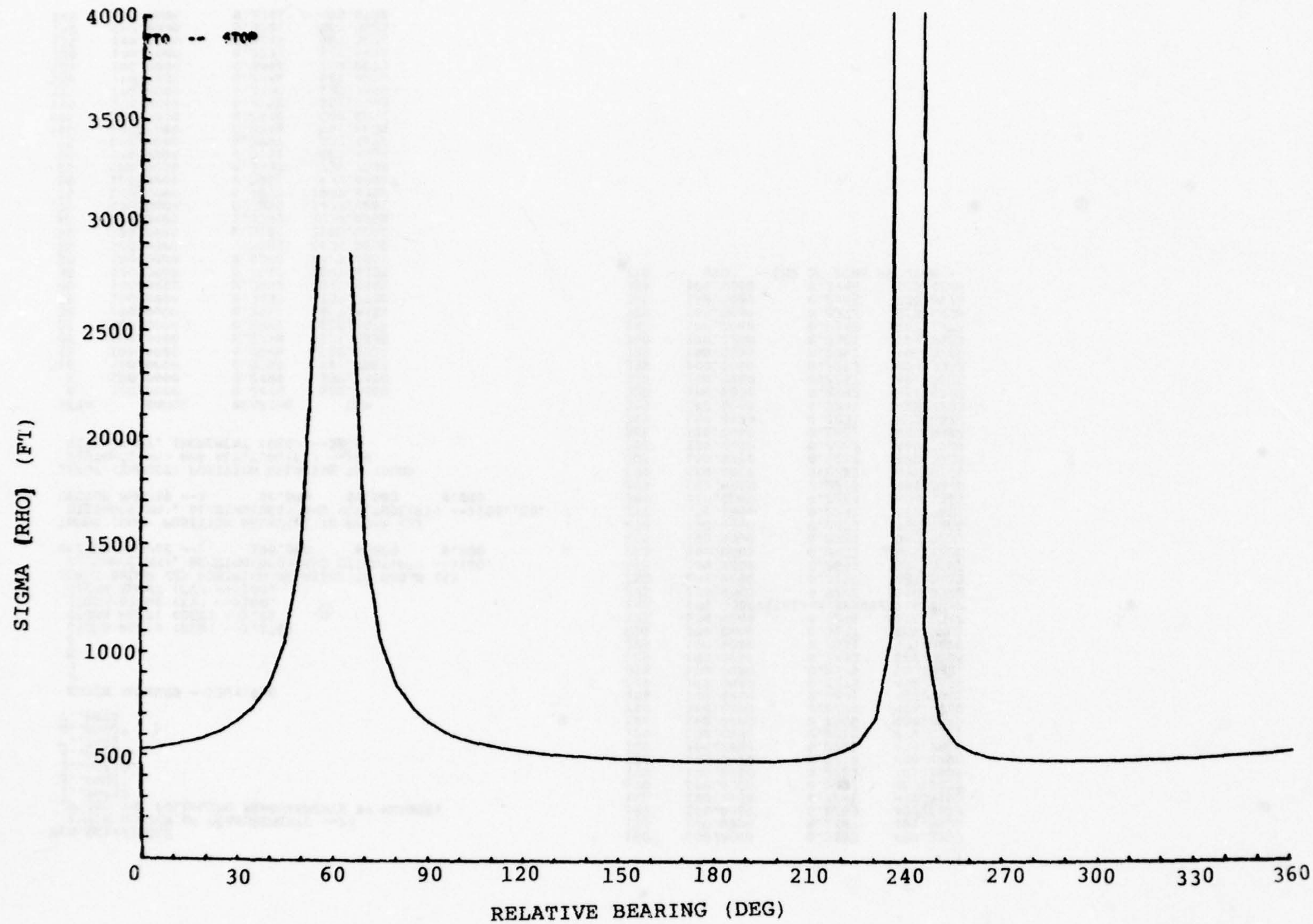
```
TT0 -- STOP --END OF BCAS PROGRAM--
>
```



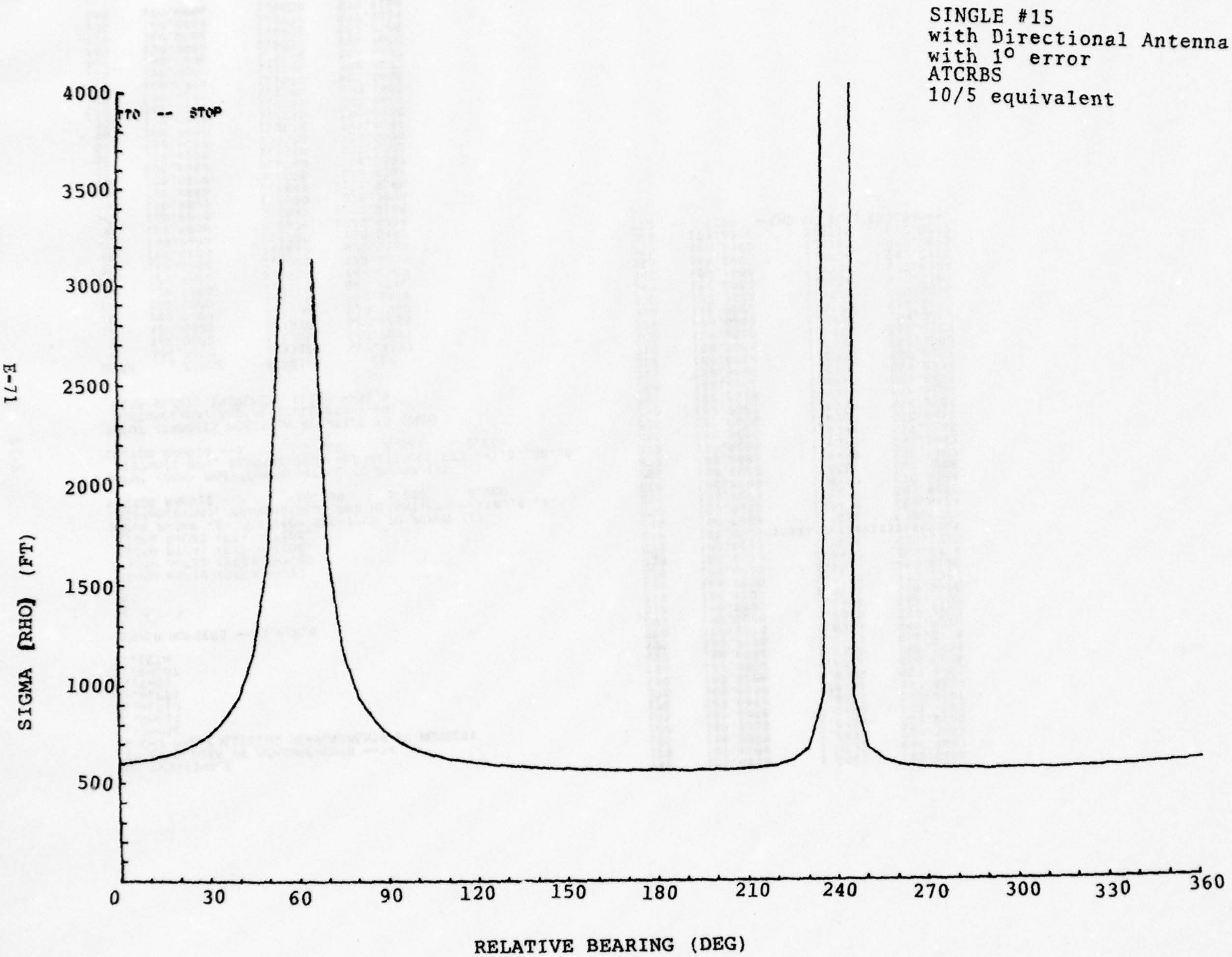
SINGLE #15
50,10 equivalent
ATCRBS
SIGMA [RHO] (FT)
4000
3500
3000
2500
2000
1500
1000
500
0
30
60
90
120
150
180
210
240
270
300
330
360
RELATIVE BEARING (DEG)

```
RUN DK1:SINGLE
  ENTER NUMBER OF MEASUREMENTS -->4
 CHOOSE THE FOLLOWING MEASUREMENTS BY NUMBER:
 1..RHO1C
 2..RHO1T
 3..ALF10
 4..ALFD1
 5..TAU1
 6..RHOOT
 7..BETA

  ENTER NUMBERS -->3,4,5,6
  3
  4
  5
  6
  SIGMA ALF10 (DEG) -->.1768
  SIGMA ALFD1 (DEG) -->.25
  SIGMA DTOA1 (FT) -->100.
  SIGMA RHOOT (FT) -->100.
 INPUT RADAR <2> POSITION RELATIVE TO RADAR <1>
  DISTANCE(NM), BEARING(DEG) AND HEIGHT(FT) -->50.
 VECTOR RHOV12 -->       50.000     0.000      0.000

 INPUT <OWN> POSITION RELATIVE TO RADAR <1>
  DISTANCE(NM), BEARING(DEG) AND ALTITUDE(FT) -->50.,60.
 VECTOR RHOV10 -->       25.000    43.301      0.000

 INPUT <TARGET> POSITION RELATIVE TO <OWN>
  DISTANCE(NM) AND ALTITUDE(FT) -->10.
  BETA START, INCREMENT (DEG) -->0,5

 BETA      RANGE       BEARING       CEP
   0     100.0000      0.3059     339.4643
   5     100.0000      0.3206     354.4075
  10     100.0000      0.3390     373.1287
  15     100.0000      0.3623     397.0071
  20     100.0000      0.3925     428.1339
  25     100.0000      0.4329     469.8194
  30     100.0000      0.4885     527.6047
  35     100.0000      0.5688     611.4849
  40     100.0000      0.6928     741.4582
  45     100.0000      0.9043     964.1686
  50     100.0000      1.3352    1419.4610
  55     100.0000      2.6445    2806.2609
  60     100.0000      1.5104    1604.8533
  65     100.0000      2.6445    2806.2609
  70     100.0000      1.3352    1419.4610
  75     100.0000      0.9043     964.1686
  80     100.0000      0.6928     741.4582
  85     100.0000      0.5688     611.4849
  90     100.0000      0.4885     527.6047
  95     100.0000      0.4329     469.8194
 100     100.0000      0.3925     428.1339
 105     100.0000      0.3623     397.0071
 110     100.0000      0.3390     373.1287
 115     100.0000      0.3206     354.4075
 120     100.0000      0.3059     339.4643
 125     100.0000      0.2939     327.3581
 130     100.0000      0.2841     317.4300
 135     100.0000      0.2759     309.2087
 140     100.0000      0.2691     302.3528
 145     100.0000      0.2633     296.6124
 150     100.0000      0.2585     291.8058
 155     100.0000      0.2545     287.8028
 160     100.0000      0.2512     284.5146
 165     100.0000      0.2485     281.8886
 170     100.0000      0.2466     279.9057
 175     100.0000      0.2452     278.5827
 180     100.0000      0.2446     277.9783
 185     100.0000      0.2448     278.2068
 190     100.0000      0.2461     279.4630
 195     100.0000      0.2487     282.0679
 200     100.0000      0.2532     286.5532
 205     100.0000      0.2606     293.8281
 210     100.0000      0.2722     305.5270
 215     100.0000      0.2914     324.8005
 220     100.0000      0.3245     358.3391
 225     100.0000      0.3871     422.5009
 230     100.0000      0.5270     567.7759
 235     100.0000      0.9847    1048.9867
 240     100.0000*****************************
 245     100.0000      0.9847    1048.9867
 250     100.0000      0.5270     567.7759
 255     100.0000      0.3871     422.5009
 260     100.0000      0.3245     358.3391
 265     100.0000      0.2914     324.8005
 270     100.0000      0.2722     305.5270
 275     100.0000      0.2606     293.8281
 280     100.0000      0.2532     286.5532
 285     100.0000      0.2487     282.0679
 290     100.0000      0.2461     279.4630
 295     100.0000      0.2448     278.2068
 300     100.0000      0.2446     277.9783
 305     100.0000      0.2452     278.5827
 310     100.0000      0.2465     279.9057
 315     100.0000      0.2485     281.8886
 320     100.0000      0.2512     284.5146
 325     100.0000      0.2545     287.8026
 330     100.0000      0.2585     291.8058
 335     100.0000      0.2633     296.6124
 340     100.0000      0.2691     302.3528
 345     100.0000      0.2759     309.2087
 350     100.0000      0.2841     317.4300
 355     100.0000      0.2939     327.3581
 360     100.0000      0.3059     339.4643
TT0  --  STOP  --END OF BCAS PROGRAM--
>
```

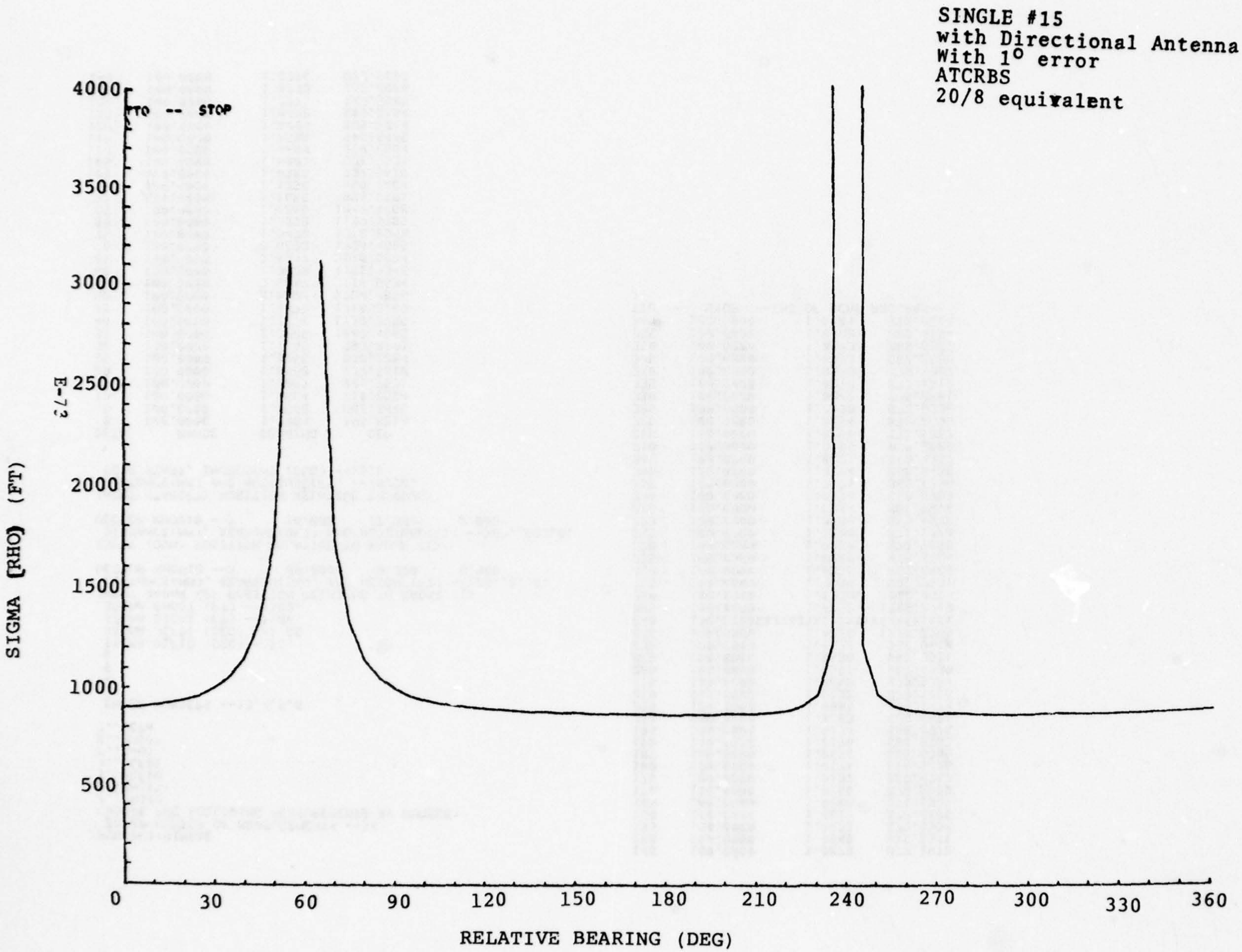
SINGLE #15
100,20 equilet
ATCRBS



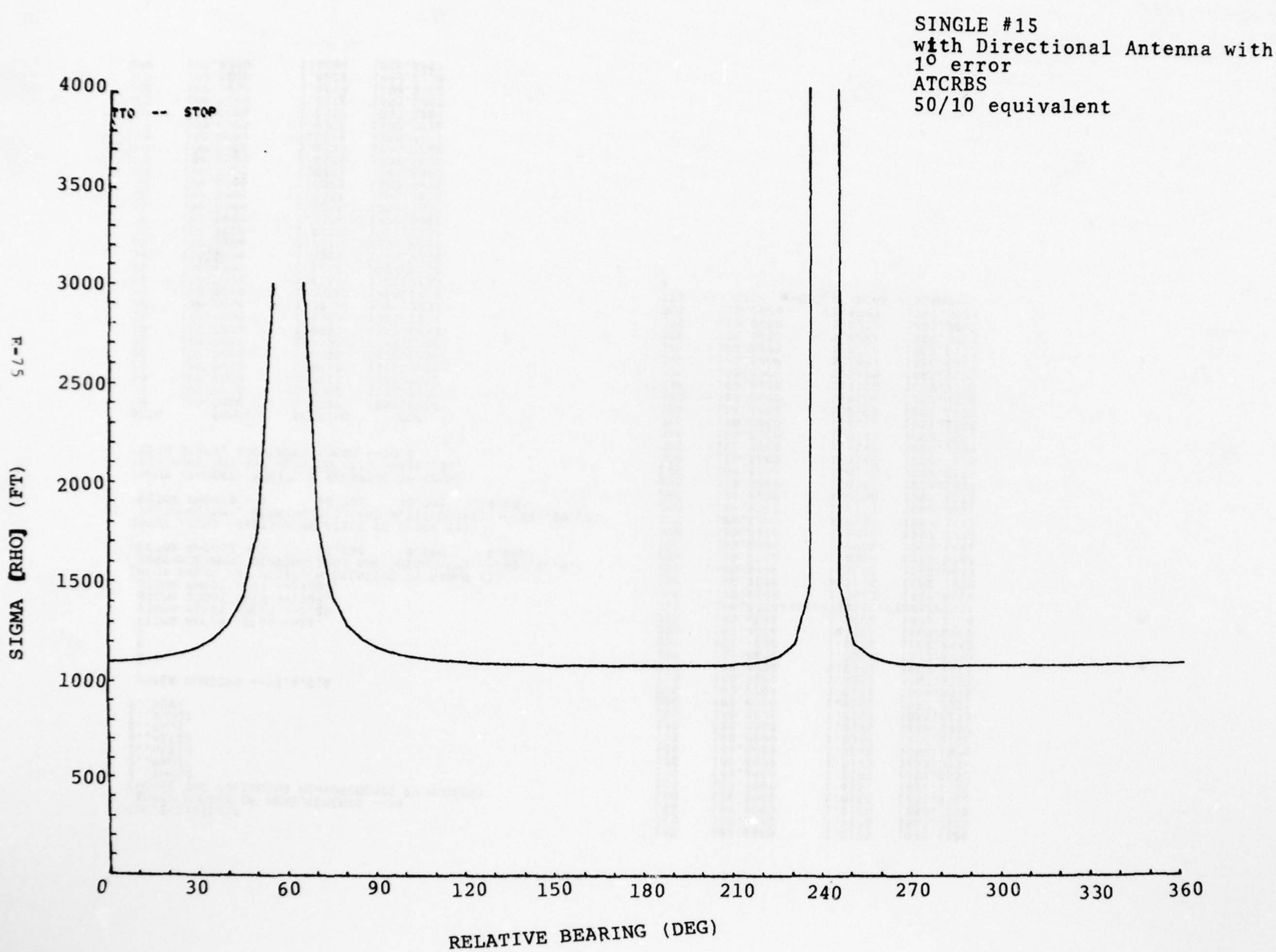
```
RUN DK1:SINGLE
  ENTER NUMBER OF MEASUREMENTS -->4
 CHOOSE THE FOLLOWING MEASUREMENTS BY NUMBER:
 1..RHO10
 2..RHO1T
 3..ALF10
 4..ALFD1
 5..THU1
 6..RHOOT
 7..BETA

  ENTER NUMBERS -->3,4,5,6
  3
  4
  5
  6
  SIGMA ALF10 (DEG) -->.1768
  SIGMA ALFD1 (DEG) -->.25
  SIGMA DTOW1 (FT) -->100.
  SIGMA RHOOT (FT) -->100.
 INPUT RADAR <2> POSITION RELATIVE TO RADAR <1>
  DISTANCE(NM), BEARING(DEG) AND HEIGHT(FT) -->100.
 VECTOR RHOV12 -->       100.000     0.000     0.000

 INPUT <OWN> POSITION RELATIVE TO RADAR <1>
  DISTANCE(NM), BEARING(DEG) AND ALTITUDE(FT) -->100.,60.
 VECTOR RHOV10 -->        50.000    86.603     0.000

 INPUT <TARGET> POSITION RELATIVE TO <OWN>
  DISTANCE(NM) AND ALTITUDE(FT) -->20.
  BETA START, INCREMENT (DEG) -->0,5

 BETA      RANGE       BEARING       CEP
  0      100.0000      0.2446     528.4226
  5      100.0000      0.2496     538.7489
  10     100.0000      0.2559     551.7903
  15     100.0000      0.2640     568.6934
  20     100.0000      0.2748     591.2636
  25     100.0000      0.2897     622.4675
  30     100.0000      0.3111     667.4484
  35     100.0000      0.3437     735.7730
  40     100.0000      0.3966     847.0405
  45     100.0000      0.4917    1047.6395
  50     100.0000      0.6950    1477.4801
  55     100.0000      1.3363    2836.0656
  60     100.0000      1.5104    3205.0298
  65     100.0000      1.3363    2836.0656
  70     100.0000      0.6950    1477.4801
  75     100.0000      0.4917    1047.6395
  80     100.0000      0.3966     847.0405
  85     100.0000      0.3437     735.7730
  90     100.0000      0.3111     667.4484
  95     100.0000      0.2897     622.4675
 100     100.0000      0.2748     591.2636
 105     100.0000      0.2640     568.6934
 110     100.0000      0.2559     551.7903
 115     100.0000      0.2496     538.7489
 120     100.0000      0.2446     528.4226
 125     100.0000      0.2406     520.0573
 130     100.0000      0.2373     513.1430
 135     100.0000      0.2345     507.3272
 140     100.0000      0.2321     502.3623
 145     100.0000      0.2301     498.0729
 150     100.0000      0.2283     494.3352
 155     100.0000      0.2267     491.0635
 160     100.0000      0.2253     488.2020
 165     100.0000      0.2241     485.7193
 170     100.0000      0.2231     483.6072
 175     100.0000      0.2223     481.8802
 180     100.0000      0.2216     480.5799
 185     100.0000      0.2212     479.7825
 190     100.0000      0.2212     479.6151
 195     100.0000      0.2215     480.2849
 200     100.0000      0.2224     482.1365
 205     100.0000      0.2241     485.7681
 210     100.0000      0.2273     492.2866
 215     100.0000      0.2329     503.9231
 220     100.0000      0.2433     525.7206
 225     100.0000      0.2651     571.0606
 230     100.0000      0.3197     685.3483
 235     100.0000      0.5245    1116.9342
 240     100.0000*****************************
 245     100.0000      0.5245    1116.9342
 250     100.0000      0.3197     685.3483
 255     100.0000      0.2651     571.0606
 260     100.0000      0.2433     525.7206
 265     100.0000      0.2329     503.9231
 270     100.0000      0.2273     492.2866
 275     100.0000      0.2241     485.7681
 280     100.0000      0.2224     482.1365
 285     100.0000      0.2215     480.2849
 290     100.0000      0.2212     479.6151
 295     100.0000      0.2212     479.7825
 300     100.0000      0.2216     480.5799
 305     100.0000      0.2223     481.8802
 310     100.0000      0.2231     483.6072
 315     100.0000      0.2241     485.7193
 320     100.0000      0.2253     488.2020
 325     100.0000      0.2267     491.0635
 330     100.0000      0.2283     494.3352
 335     100.0000      0.2301     498.0729
 340     100.0000      0.2321     502.3623
 345     100.0000      0.2345     507.3272
 350     100.0000      0.2373     513.1430
 355     100.0000      0.2406     520.0573
 360     100.0000      0.2446     528.4226
 TT0  --  STOP  --END OF BCAS PROGRAM--
 >
```


SINGLE #15
with Directional Antenna
with 1° error
ATCRBS
10/5 equivalent
TO -- STOP
4000
3500
3000
2500
2000
1500
1000
500
SIGMA [RHO] (FT)
0
30
60
90
120
150
180
210
240
270
300
330
360
RELATIVE BEARING (DEG)

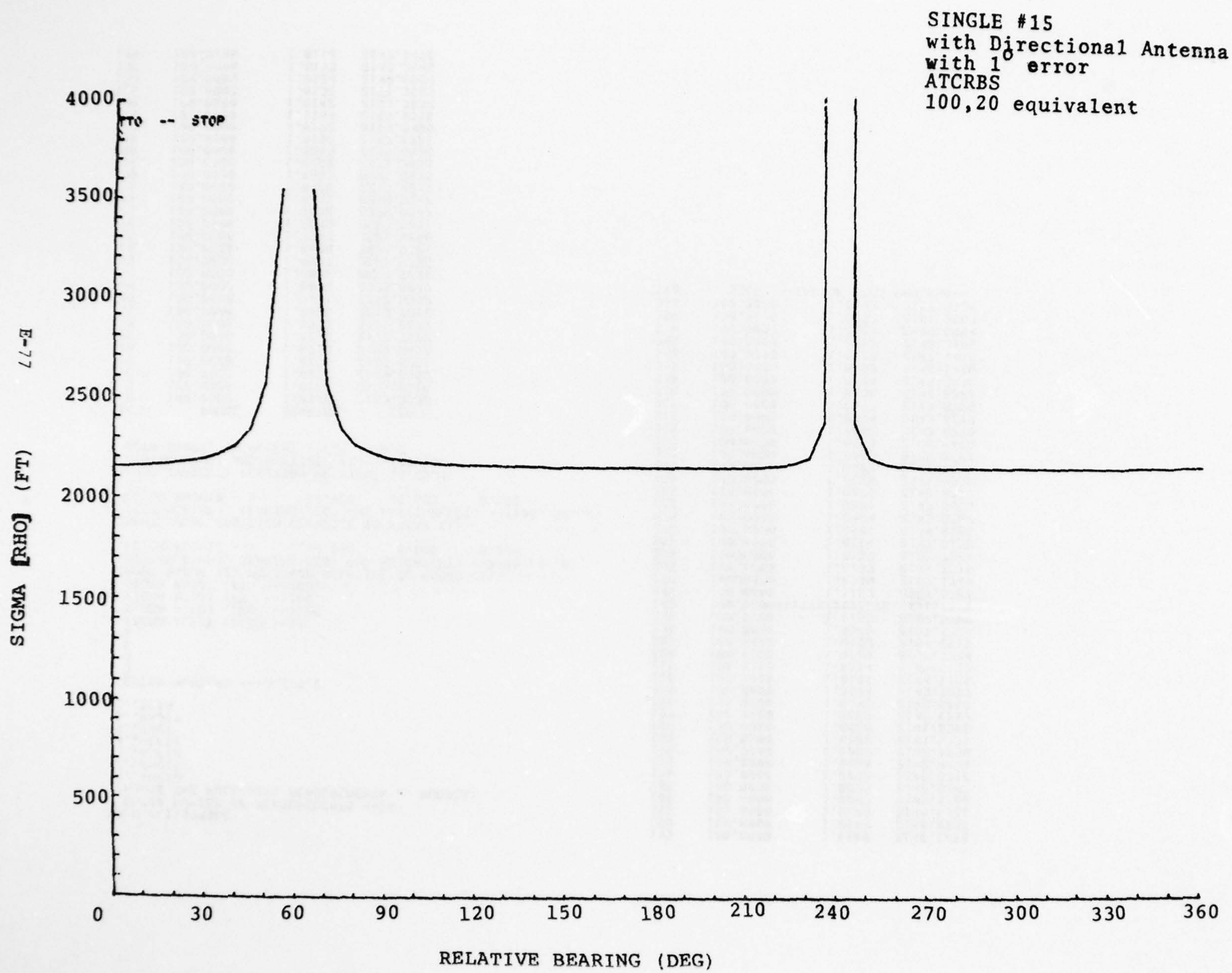
```
:SUN DK1:SINGLE
  ENTER NUMBER OF MEASUREMENTS -->4
 CHOOSE THE FOLLOWING MEASUREMENTS BY NUMBER:
 1..PHO1O
 2..PHO1T
 3..ALF1O
 4..ALFD1
 5..THU1
 6..RHOOT
 7..BETA

  ENTER NUMBERS -->3,4,5,6
  3
  4
  5
  6
  SIGMA ALF1O (DEG) -->1.
  SIGMA ALFD1 (DEG) -->.25
  SIGMA DTOA1 (FT) -->100.
  SIGMA RHOOT (FT) -->100.
 INPUT RADAR (2) POSITION RELATIVE TO RADAR (1)
  DISTANCE(NM), BEARING(DEG) AND HEIGHT(FT) -->10.,0.,0.
 VECTOR RHOV12 -->       10.000      0.000      0.000

 INPUT (OWN) POSITION RELATIVE TO RADAR (1)
  DISTANCE(NM), BEARING(DEG) AND ALTITUDE(FT) -->10.,60.,0.
 VECTOR RHOV10 -->        5.000      8.660      0.000

 INPUT (TARGET) POSITION RELATIVE TO (OWN)
  DISTANCE(NM) AND ALTITUDE(FT) -->5.,0.
  BETA START, INCREMENT (DEG) -->0,5

 BETA     RANGE       BEARING      CEP
   0    100.0000      1.1118    597.9277
   5    100.0000      1.1315    608.2677
  10    100.0000      1.1570    621.6068
  15    100.0000      1.1906    639.1968
  20    100.0000      1.2361    663.0080
  25    100.0000      1.2995    696.2802
  30    100.0000      1.3916    744.6387
  35    100.0000      1.5322    818.5638
  40    100.0000      1.7619    939.5622
  45    100.0000      2.1769   1158.6087
  50    100.0000      3.0675   1629.5704
  55    100.0000      5.8847   3121.9166
  60    100.0000      1.2500    670.3026
  65    100.0000      5.8847   3121.9166
  70    100.0000      3.0675   1629.5704
  75    100.0000      2.1769   1158.6087
  80    100.0000      1.7619    939.5622
  85    100.0000      1.5322    818.5638
  90    100.0000      1.3916    744.6387
  95    100.0000      1.2995    696.2802
 100    100.0000      1.2361    663.0080
 105    100.0000      1.1906    639.1968
 110    100.0000      1.1570    621.6068
 115    100.0000      1.1315    608.2677
 120    100.0000      1.1118    597.9277
 125    100.0000      1.0961    589.7625
 130    100.0000      1.0836    583.2126
 135    100.0000      1.0734    577.8884
 140    100.0000      1.0650    573.5128
 145    100.0000      1.0581    569.8856
 150    100.0000      1.0523    566.8603
 155    100.0000      1.0474    564.3289
 160    100.0000      1.0434    562.2128
 165    100.0000      1.0400    560.4553
 170    100.0000      1.0373    559.0191
 175    100.0000      1.0351    557.8834
 180    100.0000      1.0335    557.0453
 185    100.0000      1.0325    556.5220
 190    100.0000      1.0322    556.3586
 195    100.0000      1.0327    556.6418
 200    100.0000      1.0344    557.5286
 205    100.0000      1.0378    559.3053
 210    100.0000      1.0440    562.5197
 215    100.0000      1.0551    568.3088
 220    100.0000      1.0762    579.3324
 225    100.0000      1.1215    603.0106
 230    100.0000      1.2430    666.6414
 235    100.0000      1.7611    939.1257
 240    100.0000*****************************
 245    100.0000      1.7611    939.1257
 250    100.0000      1.2430    666.6414
 255    100.0000      1.1215    603.0106
 260    100.0000      1.0762    579.3324
 265    100.0000      1.0551    568.3088
 270    100.0000      1.0440    562.5197
 275    100.0000      1.0378    559.3053
 280    100.0000      1.0344    557.5286
 285    100.0000      1.0327    556.6418
 290    100.0000      1.0322    556.3586
 295    100.0000      1.0325    556.5220
 300    100.0000      1.0335    557.0453
 305    100.0000      1.0351    557.8834
 310    100.0000      1.0373    559.0191
 315    100.0000      1.0400    560.4553
 320    100.0000      1.0434    562.2128
 325    100.0000      1.0474    564.3289
 330    100.0000      1.0523    566.8603
 335    100.0000      1.0581    569.8856
 340    100.0000      1.0650    573.5128
 345    100.0000      1.0734    577.8884
 350    100.0000      1.0836    583.2126
 355    100.0000      1.0961    589.7625
 360    100.0000      1.1118    597.9277
TT0 --  STOP  --END OF BCAS PROGRAM--
>
```


SINGLE #15
with Directional Antenna
With 1° error
ATCRBS
20/8 equivalent
TO -- STOP
SIGMA (RHO) (FT)
4000
3500
3000
2500
2000
1500
1000
500
0
30
60
90
120
150
180
210
240
270
300
330
360
RELATIVE BEARING (DEG)

```
>RUN DK1:SINGLE
  ENTER NUMBER OF MEASUREMENTS -->4
 CHOOSE THE FOLLOWING MEASUREMENTS BY NUMBER:
 1..RHO10
 2..RHO1T
 3..ALF10
 4..ALFD1
 5..THU1
 6..RHO0T
 7..BETA

  ENTER NUMBERS -->3,4,5,6
  3
  4
  5
  6
  SIGMA ALF10 (DEG) -->1.
  SIGMA ALFD1 (DEG) -->.25
  SIGMA DTOA1 (FT) -->100.
  SIGMA RHO0T (FT) -->100.
 INPUT RADAR (2) POSITION RELATIVE TO RADAR (1)
  DISTANCE(NM), BEARING(DEG) AND HEIGHT(FT) -->20.,0.,0.
 VECTOR RHOV12 -->      20.000     0.000     0.000

 INPUT (OWN) POSITION RELATIVE TO RADAR (1)
  DISTANCE(NM), BEARING(DEG) AND ALTITUDE(FT) -->20.,60.,0.
 VECTOR RHOV10 -->      10.000    17.321     0.000

 INPUT (TARGET) POSITION RELATIVE TO (OWN)
  DISTANCE(NM) AND ALTITUDE(FT) -->8.,0.
  BETA START, INCREMENT (DEG) -->0,5

 BETA     RANGE        BEARING      CEP
   0    100.0000      1.0484    895.0214
   5    100.0200      1.0562    901.6445
  10    100.0000      1.0664    910.2594
  15    100.0000      1.0801    921.7531
  20    100.0000      1.0988    937.5618
  25    100.0000      1.1256    960.1284
  30    100.0000      1.1655    993.8691
  35    100.0000      1.2289   1047.4068
  40    100.0000      1.3378   1139.3785
  45    100.0000      1.5470   1316.2969
  50    100.0000      2.0292   1724.4856
  55    100.0000      3.6647   3110.6694
  60    100.0000      1.3288   1131.7346
  65    100.0000      3.6647   3110.6694
  70    100.0000      2.0292   1724.4856
  75    100.0000      1.5470   1316.2969
  80    100.0000      1.3378   1139.3785
  85    100.0000      1.2289   1047.4068
  90    100.0000      1.1655    993.8691
  95    100.0000      1.1256    960.1284
 100    100.0000      1.0988    937.5618
 105    100.0000      1.0801    921.7531
 110    100.0000      1.0664    910.2594
 115    100.0000      1.0562    901.6445
 120    100.0000      1.0484    895.0214
 125    100.0000      1.0422    889.8194
 130    100.0000      1.0373    885.6589
 135    100.0000      1.0333    882.2800
 140    100.0000      1.0300    879.5007
 145    100.0000      1.0272    877.1912
 150    100.0000      1.0249    875.2581
 155    100.0000      1.0230    873.6336
 160    100.0000      1.0214    872.2695
 165    100.0000      1.0200    871.1327
 170    100.0000      1.0189    870.2029
 175    100.0000      1.0181    869.4717
 180    100.0000      1.0174    868.9436
 185    100.0000      1.0171    868.6386
 190    100.0000      1.0170    868.5983
 195    100.0000      1.0174    868.8976
 200    100.0000      1.0183    869.6682
 205    100.0000      1.0200    871.1474
 210    100.0000      1.0232    873.7880
 215    100.0000      1.0288    878.5324
 220    100.0000      1.0396    887.6080
 225    100.0000      1.0630    907.3531
 230    100.0000      1.1278    962.0514
 235    100.0000      1.4288   1216.2708
 240    100.0000*******************************
 245    100.0000      1.4288   1216.2708
 250    100.0000      1.1278    962.0514
 255    100.0000      1.0630    907.3531
 260    100.0000      1.0396    887.6080
 265    100.0000      1.0288    878.5324
 270    100.0000      1.0232    873.7880
 275    100.0000      1.0200    871.1474
 280    100.0000      1.0183    869.6682
 285    100.0000      1.0174    868.8976
 290    100.0000      1.0170    868.5983
 295    100.0000      1.0171    868.6386
 300    100.0000      1.0174    868.9436
 305    100.0000      1.0181    869.4717
 310    100.0000      1.0189    870.2029
 315    100.0000      1.0200    871.1327
 320    100.0000      1.0214    872.2695
 325    100.0000      1.0230    873.6336
 330    100.0000      1.0249    875.2581
 335    100.0000      1.0272    877.1912
 340    100.0000      1.0300    879.5007
 345    100.0000      1.0333    882.2800
 350    100.0000      1.0373    885.6589
 355    100.0000      1.0422    889.8194
 360    100.0000      1.0484    895.0214
TT0  --  STOP  --END OF BCAS PROGRAM--
>
```

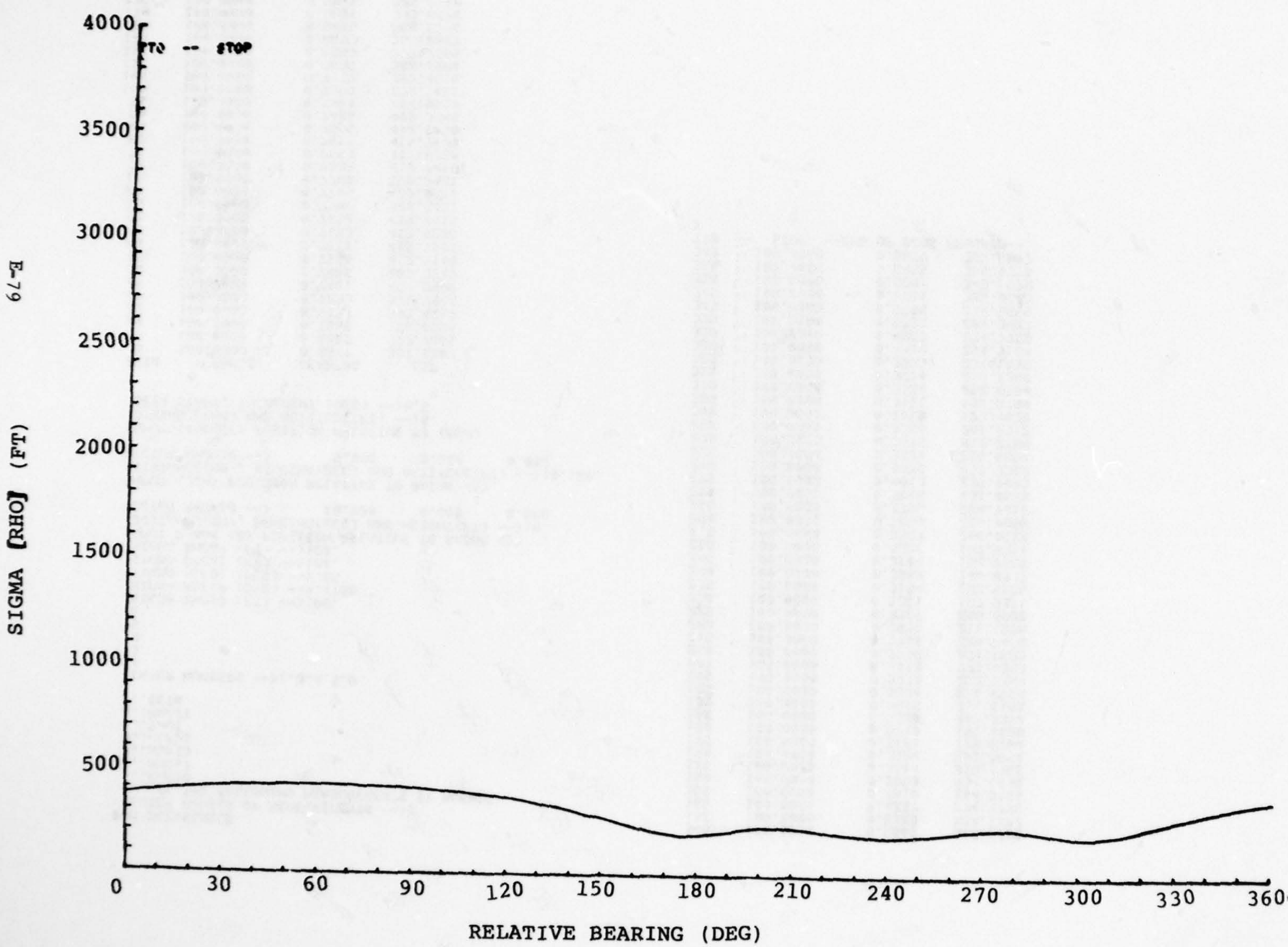

SINGLE #15
with Directional Antenna with
1° error
ATCRBS
50/10 equivalent
TO -- STOP
4000
3500
3000
2500
2000
1500
1000
500
SIGMA [RHO] (FT)
0
30
60
90
120
150
180
210
240
270
300
330
360
RELATIVE BEARING (DEG)

```
RUN DK1:SINGLE
 ENTER NUMBER OF MEASUREMENTS -->4
CHOOSE THE FOLLOWING MEASUREMENTS BY NUMBER:
1..RHO10
2..RHO1T
3..ALF10
4..ALFD1
5..THU1
6..RHOOT
7..BETA

 ENTER NUMBERS -->3,4,5,6
 3
 4
 5
 6
 SIGMA ALF10 (DEG) -->1.
 SIGMA ALFD1 (DEG) -->.25
 SIGMA DTOA1 (FT) -->100.
 SIGMA RHOOT (FT) -->100.
INPUT RADAR <2> POSITION RELATIVE TO RADAR <1>
 DISTANCE(NM), BEARING(DEG) AND HEIGHT(FT) -->50.,0.,0.
VECTOR RHOV12 -->        50.000     0.000      0.000

INPUT <OWN> POSITION RELATIVE TO RADAR <1>
 DISTANCE(NM), BEARING(DEG) AND ALTITUDE(FT) -->50.,60.,0.
VECTOR RHOV10 -->        25.000    43.301      0.000

INPUT <TARGET> POSITION RELATIVE TO <OWN>
 DISTANCE(NM) AND ALTITUDE(FT) -->10.,0.
 BETA START, INCREMENT (DEG) -->0,5

BETA      RANGE          BEARING      CEP
  0     100.0000         1.0307    1097.5904
  5     100.0000         1.0352    1102.3036
 10     100.0000         1.0410    1108.4646
 15     100.0000         1.0488    1116.7288
 20     100.0000         1.0596    1128.1699
 25     100.0000         1.0752    1144.6392
 30     100.0000         1.0988    1169.5449
 35     100.0000         1.1368    1209.7034
 40     100.0000         1.2036    1280.3237
 45     100.0000         1.3366    1420.9468
 50     100.0000         1.6587    1761.9132
 55     100.0000         2.8218    2994.0890
 60     100.0000         1.8028    1914.4249
 65     100.0000         2.8218    2994.0890
 70     100.0000         1.6587    1761.9132
 75     100.0000         1.3366    1420.9468
 80     100.0000         1.2036    1280.3237
 85     100.0000         1.1368    1209.7034
 90     100.0000         1.0988    1169.5449
 95     100.0000         1.0752    1144.6392
100     100.0000         1.0596    1128.1699
105     100.0000         1.0488    1116.7288
110     100.0000         1.0410    1108.4646
115     100.0000         1.0352    1102.3036
120     100.0000         1.0307    1097.5904
125     100.0000         1.0272    1093.9067
130     100.0000         1.0244    1090.9768
135     100.0000         1.0222    1088.6132
140     100.0000         1.0204    1086.6857
145     100.0000         1.0189    1085.1026
150     100.0000         1.0176    1083.7985
155     100.0000         1.0166    1082.7276
160     100.0000         1.0158    1081.8582
165     100.0000         1.0151    1081.1706
170     100.0000         1.0147    1080.6553
175     100.0000         1.0143    1080.3134
180     100.0000         1.0142    1080.1576
185     100.0000         1.0142    1080.2165
190     100.0000         1.0145    1080.5407
195     100.0000         1.0152    1081.2173
200     100.0000         1.0163    1082.3961
205     100.0000         1.0181    1084.3448
210     100.0000         1.0212    1087.5732
215     100.0000         1.0265    1093.1441
220     100.0000         1.0364    1103.5740
225     100.0000         1.0576    1126.0443
230     100.0000         1.1165    1188.2079
235     100.0000         1.3922    1479.8114
240     100.0000***************************
245     100.0000         1.3922    1479.8114
250     100.0000         1.1165    1188.2079
255     100.0000         1.0576    1126.0443
260     100.0000         1.0364    1103.5740
265     100.0000         1.0265    1093.1441
270     100.0000         1.0212    1087.5732
275     100.0000         1.0181    1084.3448
280     100.0000         1.0163    1082.3961
285     100.0000         1.0152    1081.2173
290     100.0000         1.0145    1080.5407
295     100.0000         1.0142    1080.2165
300     100.0000         1.0142    1080.1576
305     100.0000         1.0143    1080.3134
310     100.0000         1.0147    1080.6553
315     100.0000         1.0151    1081.1706
320     100.0000         1.0158    1081.8582
325     100.0000         1.0166    1082.7276
330     100.0000         1.0176    1083.7985
335     100.0000         1.0189    1085.1026
340     100.0000         1.0204    1086.6857
345     100.0000         1.0222    1088.6132
350     100.0000         1.0244    1090.9768
355     100.0000         1.0272    1093.9067
360     100.0000         1.0307    1097.5904
TT0  --  STOP  --END OF BCAS PROGRAM--
>
```


SINGLE #15
with Directional Antenna
with 1° error
ATCRBS
100,20 equivalent
TO -- STOP
4000
3500
3000
2500
2000
1500
1000
500
0
30
60
90
120
150
180
210
240
270
300
330
360
SIGMA [RHO] (FT)
RELATIVE BEARING (DEG)

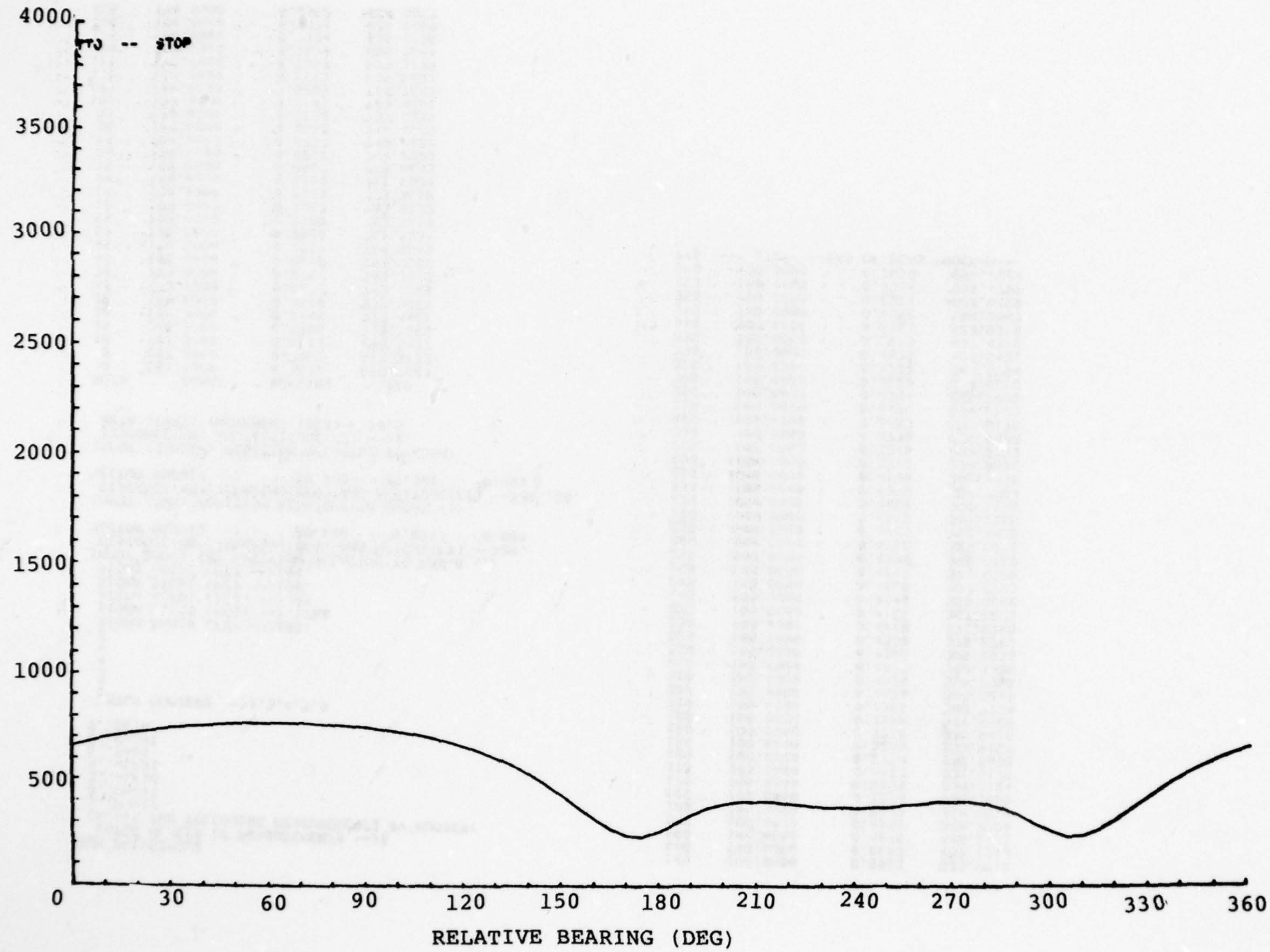
```
>RUN DK1:SINGLE
 ENTER NUMBER OF MEASUREMENTS -->4
CHOOSE THE FOLLOWING MEASUREMENTS B. NUMBER:
1..RHO10
2..RHO1T
3..ALF10
4..ALFD1
5..TAU1
6..RHOOT
7..BETA
 ENTER NUMBERS -->3,4,5,6
 3
 4
 5
 6
 SIGMA ALF10 (DEG) -->1.
 SIGMA ALFD1 (DEG) -->.25
 SIGMA DTOA1 (FT) -->100.
 SIGMA RHOOT (FT) -->100.
INPUT RADAR (2) POSITION RELATIVE TO RADAR (1)
 DISTANCE(NM), BEARING(DEG) AND HEIGHT(FT) -->100.,0.,0.
VECTOR RHOV12 -->      100.000      0.000      0.000

INPUT (OWN) POSITION RELATIVE TO RADAR (1)
 DISTANCE(NM), BEARING(DEG) AND ALTITUDE(FT) -->100.,60.,0.
VECTOR RHOV10 -->       50.000     86.603      0.000

INPUT (TARGET) POSITION RELATIVE TO (OWN)
 DISTANCE(NM) AND ALTITUDE(FT) -->20.,0.
 BETA START, INCREMENT (DEG) -->0,5

BETA      RANGE      BEARING       CEP
  0     100.0000     1.0142    2153.3938
  5     100.0000     1.0154    2155.9510
 10     100.0000     1.0170    2159.2469
 15     100.0000     1.0190    2163.6281
 20     100.0000     1.0219    2169.6698
 25     100.0000     1.0260    2178.3802
 30     100.0000     1.0323    2191.6573
 35     100.0000     1.0425    2213.4219
 40     100.0000     1.0611    2252.8542
 45     100.0000     1.1002    2335.6847
 50     100.0000     1.2049    2557.5031
 55     100.0000     1.6597    3521.5256
 60     100.0000     1.8028    3824.9301
 65     100.0000     1.6597    3521.5256
 70     100.0000     1.2049    2557.5031
 75     100.0000     1.1002    2335.6847
 80     100.0000     1.0611    2252.8542
 85     100.0000     1.0425    2213.4219
 90     100.0000     1.0323    2191.6573
 95     100.0000     1.0260    2178.3802
100     100.0000     1.0219    2169.6698
105     100.0000     1.0190    2163.6281
110     100.0000     1.0170    2159.2469
115     100.0000     1.0154    2155.9510
120     100.0000     1.0142    2153.3938
125     100.0000     1.0132    2151.3563
130     100.0000     1.0124    2149.6954
135     100.0000     1.0118    2148.3145
140     100.0000     1.0112    2147.1475
145     100.0000     1.0108    2146.1480
150     100.0000     1.0104    2145.2836
155     100.0000     1.0100    2144.5321
160     100.0000     1.0097    2143.8786
165     100.0000     1.0094    2143.3147
170     100.0000     1.0092    2142.8370
175     100.0000     1.0090    2142.4479
180     100.0000     1.0089    2142.1558
185     100.0000     1.0088    2141.9771
190     100.0000     1.0088    2141.9396
195     100.0000     1.0089    2142.0897
200     100.0000     1.0091    2142.5056
205     100.0000     1.0094    2143.3257
210     100.0000     1.0101    2144.8125
215     100.0000     1.0114    2147.5132
220     100.0000     1.0139    2152.7324
225     100.0000     1.0193    2164.2515
230     100.0000     1.0349    2197.1747
235     100.0000     1.1153    2367.5761
240     100.0000**************************
245     100.0000     1.1153    2367.5761
250     100.0000     1.0349    2197.1747
255     100.0000     1.0193    2164.2515
260     100.0000     1.0139    2152.7324
265     100.0000     1.0114    2147.5132
270     100.0000     1.0101    2144.8125
275     100.0000     1.0094    2143.3257
280     100.0000     1.0091    2142.5056
285     100.0000     1.0089    2142.0897
290     100.0000     1.0088    2141.9396
295     100.0000     1.0088    2141.9771
300     100.0000     1.0089    2142.1558
305     100.0000     1.0090    2142.4479
310     100.0000     1.0092    2142.8370
315     100.0000     1.0094    2143.3147
320     100.0000     1.0097    2143.8786
325     100.0000     1.0100    2144.5321
330     100.0000     1.0104    2145.2836
335     100.0000     1.0108    2146.1480
340     100.0000     1.0112    2147.1475
345     100.0000     1.0118    2148.3145
350     100.0000     1.0124    2149.6954
355     100.0000     1.0132    2151.3563
360     100.0000     1.0142    2153.3938
TT0  --  STOP  --END OF BCAS PROGRAM--
>
```

Semi-Act
SINGLE #20
10,5 equivalent
ATCRBS

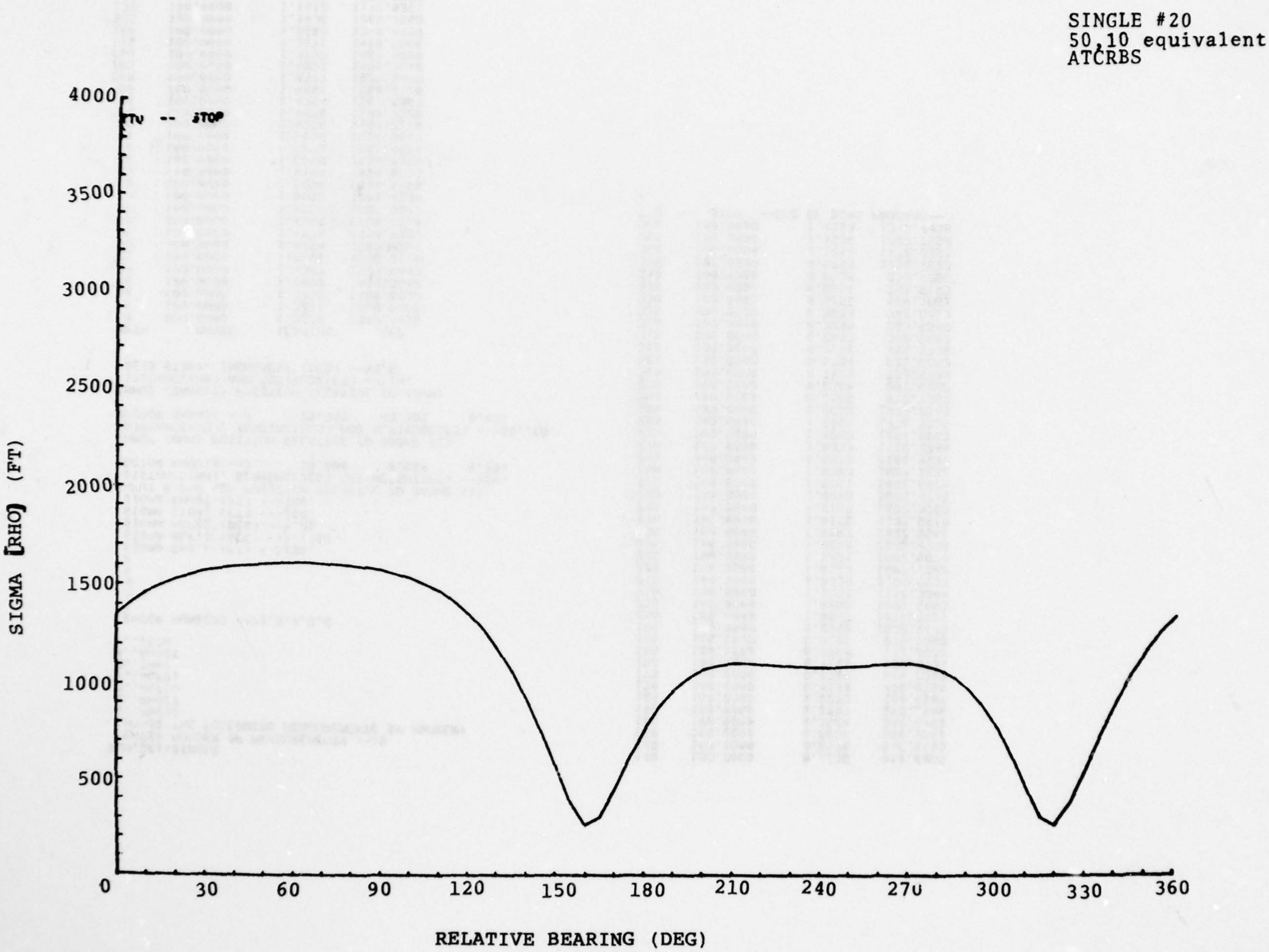


```
RUN DK1:SINGLE
 ENTER NUMBER OF MEASUREMENTS -->5
 CHOOSE THE FOLLOWING MEASUREMENTS BY NUMBER:
 1..RHO10
 2..RHO1T
 3..ALF10
 4..ALFD1
 5..TAU1
 6..RHO0T
 7..BETA

  ENTER NUMBERS -->1,3,4,5,6
  1
  3
  4
  5
  6
  SIGMA RHO10 (FT) -->100.
  SIGMA ALF10 (DEG) -->.1768
  SIGMA ALFD1 (DEG) -->.25
  SIGMA DTOA1 (FT) -->100.
  SIGMA RHO0T (FT) -->100.
 INPUT RADAR (2) POSITION RELATIVE TO RADAR (1)
  DISTANCE(NM), BEARING(DEG) AND HEIGHT(FT) -->10.
 VECTOR RHOV12 -->      10.000      0.000      0.000

 INPUT (OWN) POSITION RELATIVE TO RADAR (1)
  DISTANCE(NM), BEARING(DEG) AND ALTITUDE(FT) -->10.,60.
 VECTOR RHOV10 -->       5.000      8.660      0.000

 INPUT (TARGET) POSITION RELATIVE TO (OWN)
  DISTANCE(NM) AND ALTITUDE(FT) -->5.
  BETA START, INCREMENT (DEG) -->0,5

 BETA      RANGE       BEARING      CEP
   0     100.0000      0.6677    367.8807
   5     100.0000      0.6869    377.7065
  10     100.0000      0.7035    386.1980
  15     100.0000      0.7177    393.4910
  20     100.0000      0.7299    399.7086
  25     100.0000      0.7401    404.9590
  30     100.0000      0.7486    409.3349
  35     100.0000      0.7555    412.9140
  40     100.0000      0.7611    415.7599
  45     100.0000      0.7653    417.9230
  50     100.0000      0.7682    419.4415
  55     100.0000      0.7700    420.3421
  60     100.0000      0.7706    420.6405
  65     100.0000      0.7700    420.3421
  70     100.0000      0.7682    419.4415
  75     100.0000      0.7653    417.9230
  80     100.0000      0.7611    415.7599
  85     100.0000      0.7555    412.9140
  90     100.0000      0.7486    409.3349
  95     100.0000      0.7401    404.9590
 100     100.0000      0.7299    399.7086
 105     100.0000      0.7177    393.4910
 110     100.0000      0.7035    386.1980
 115     100.0000      0.6869    377.7065
 120     100.0000      0.6677    367.8807
 125     100.0000      0.6455    356.5776
 130     100.0000      0.6201    343.6578
 135     100.0000      0.5911    329.0060
 140     100.0000      0.5585    312.5659
 145     100.0000      0.5222    294.3987
 150     100.0000      0.4827    274.7759
 155     100.0000      0.4410    254.3164
 160     100.0000      0.3993    234.1635
 165     100.0000      0.3614    216.1365
 170     100.0000      0.3324    202.6550
 175     100.0000      0.3181    196.0794
 180     100.0000      0.3210    197.4029
 185     100.0000      0.3380    205.2312
 190     100.0000      0.3615    216.2158
 195     100.0000      0.3834    226.5594
 200     100.0000      0.3976    233.3364
 205     100.0000      0.4013    235.0943
 210     100.0000      0.3945    231.8528
 215     100.0000      0.3796    224.7416
 220     100.0000      0.3600    215.4990
 225     100.0000      0.3397    206.0029
 230     100.0000      0.3221    197.9311
 235     100.0000      0.3104    192.5625
 240     100.0000      0.3062    190.6847
 245     100.0000      0.3104    192.5625
 250     100.0000      0.3221    197.9311
 255     100.0000      0.3397    206.0029
 260     100.0000      0.3600    215.4990
 265     100.0000      0.3796    224.7416
 270     100.0000      0.3945    231.8528
 275     100.0000      0.4013    235.0943
 280     100.0000      0.3976    233.3364
 285     100.0000      0.3834    226.5594
 290     100.0000      0.3615    216.2158
 295     100.0000      0.3380    205.2312
 300     100.0000      0.3210    197.4029
 305     100.0000      0.3181    196.0794
 310     100.0000      0.3324    202.6550
 315     100.0000      0.3614    216.1365
 320     100.0000      0.3993    234.1635
 325     100.0000      0.4410    254.3164
 330     100.0000      0.4827    274.7759
 335     100.0000      0.5222    294.3987
 340     100.0000      0.5585    312.5659
 345     100.0000      0.5911    329.0060
 350     100.0000      0.6201    343.6578
 355     100.0000      0.6455    356.5776
 360     100.0000      0.6677    367.8807
 TT0  --  STOP  --END OF BCAS PROGRAM--
 >
```

SINGLE #20
20,8 equivalent
ATCRBS



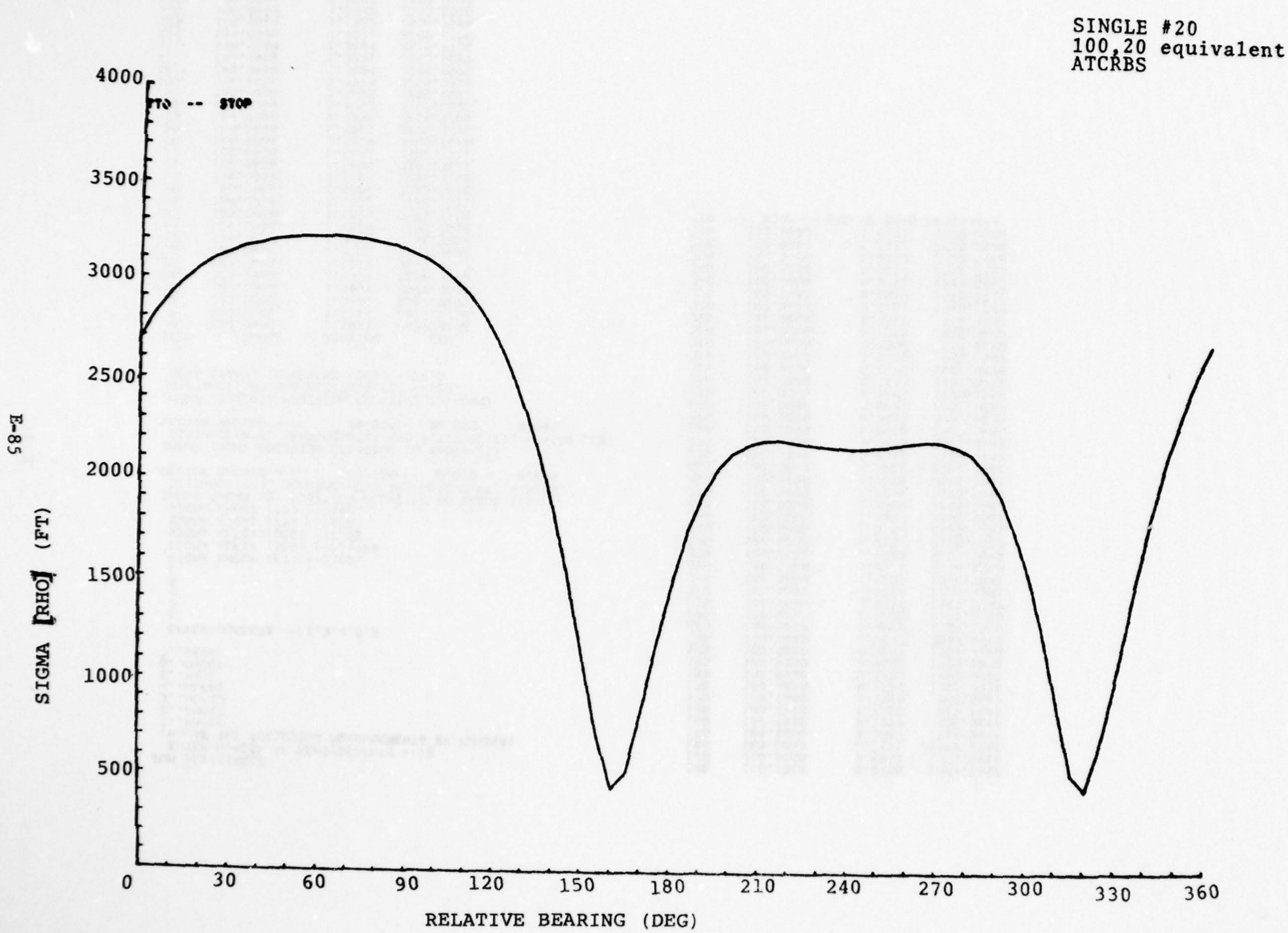
```
RUN DK1:SINGLE
 ENTER NUMBER OF MEASUREMENTS -->5
 CHOOSE THE FOLLOWING MEASUREMENTS BY NUMBER:
 1..RHO10
 2..RHO1T
 3..ALF10
 4..ALFD1
 5..TAU1
 6..RHODT
 7..BETA

  ENTER NUMBERS -->1,3,4,5,6
  1
  3
  4
  5
  6
  SIGMA RHO10 (FT) -->100.
  SIGMA ALF10 (DEG) -->.1768
  SIGMA ALFD1 (DEG) -->.25
  SIGMA DTOA1 (FT) -->100.
  SIGMA RHODT (FT) -->100.
 INPUT RADAR <2> POSITION RELATIVE TO RADAR <1>
  DISTANCE(NM), BEARING(DEG) AND HEIGHT(FT) -->20.
 VECTOR RHOV12 -->        20.000     0.000      0.000

 INPUT <OWN> POSITION RELATIVE TO RADAR <1>
  DISTANCE(NM), BEARING(DEG) AND ALTITUDE(FT) -->20.,60.
 VECTOR RHOV10 -->        10.000    17.321      0.000

 INPUT <TARGET> POSITION RELATIVE TO <OWN>
  DISTANCE(NM) AND ALTITUDE(FT) -->8.
  BETA START, INCREMENT (DEG) -->0,5

 BETA      RANGE        BEARING      CEP
  0     100.0000       0.7639    655.7624
  5     100.0000       0.7897    677.3733
 10     100.0000       0.8113    695.5497
 15     100.0000       0.8295    710.7699
 20     100.0000       0.8445    723.4461
 25     100.0000       0.8570    733.9258
 30     100.0000       0.8672    742.4965
 35     100.0000       0.8754    749.3923
 40     100.0000       0.8818    754.7999
 45     100.0000       0.8867    758.8643
 50     100.0000       0.8900    761.6934
 55     100.0000       0.8920    763.3618
 60     100.0000       0.8927    763.9132
 65     100.0000       0.8920    763.3618
 70     100.0000       0.8900    761.6934
 75     100.0000       0.8867    758.8643
 80     100.0000       0.8818    754.7999
 85     100.0000       0.8754    749.3923
 90     100.0000       0.8672    742.4965
 95     100.0000       0.8570    733.9258
100     100.0000       0.8445    723.4461
105     100.0000       0.8295    710.7699
110     100.0000       0.8113    695.5497
115     100.0000       0.7897    677.3733
120     100.0000       0.7639    655.7624
125     100.0000       0.7334    630.1795
130     100.0000       0.6974    600.0489
135     100.0000       0.6552    564.8057
140     100.0000       0.6063    523.9918
145     100.0000       0.5503    477.4316
150     100.0000       0.4875    425.5431
155     100.0000       0.4197    369.8794
160     100.0000       0.3509    314.0518
165     100.0000       0.2894    265.1095
170     100.0000       0.2496    234.2124
175     100.0000       0.2463    231.6175
180     100.0000       0.2772    255.5492
185     100.0000       0.3245    292.9153
190     100.0000       0.3718    330.9086
195     100.0000       0.4100    361.8940
200     100.0000       0.4355    382.7754
205     100.0000       0.4486    393.5226
210     100.0000       0.4515    395.8956
215     100.0000       0.4473    392.4435
220     100.0000       0.4392    385.8016
225     100.0000       0.4300    378.2789
230     100.0000       0.4219    371.6728
235     100.0000       0.4165    367.2293
240     100.0000       0.4146    365.6698
245     100.0000       0.4165    367.2293
250     100.0000       0.4219    371.6728
255     100.0000       0.4300    378.2789
260     100.0000       0.4392    385.8016
265     100.0000       0.4473    392.4435
270     100.0000       0.4515    395.8956
275     100.0000       0.4486    393.5226
280     100.0000       0.4355    382.7754
285     100.0000       0.4100    361.8940
290     100.0000       0.3718    330.9086
295     100.0000       0.3245    292.9153
300     100.0000       0.2772    255.5492
305     100.0000       0.2463    231.6175
310     100.0000       0.2496    234.2124
315     100.0000       0.2894    265.1095
320     100.0000       0.3509    314.0518
325     100.0000       0.4197    369.8794
330     100.0000       0.4875    425.5431
335     100.0000       0.5503    477.4316
340     100.0000       0.6063    523.9918
345     100.0000       0.6552    564.8057
350     100.0000       0.6974    600.0489
355     100.0000       0.7334    630.1795
360     100.0000       0.7639    655.7624
TT0  --  STOP  --END OF BCAS PROGRAM--
>
```


SINGLE #20
50,10 equivalent
ATCRBS
FTU -- STOP
SIGMA [RHO] (FT)
4000
3500
3000
2500
2000
1500
1000
500
0
30
60
90
120
150
180
210
240
270
300
330
360
RELATIVE BEARING (DEG)

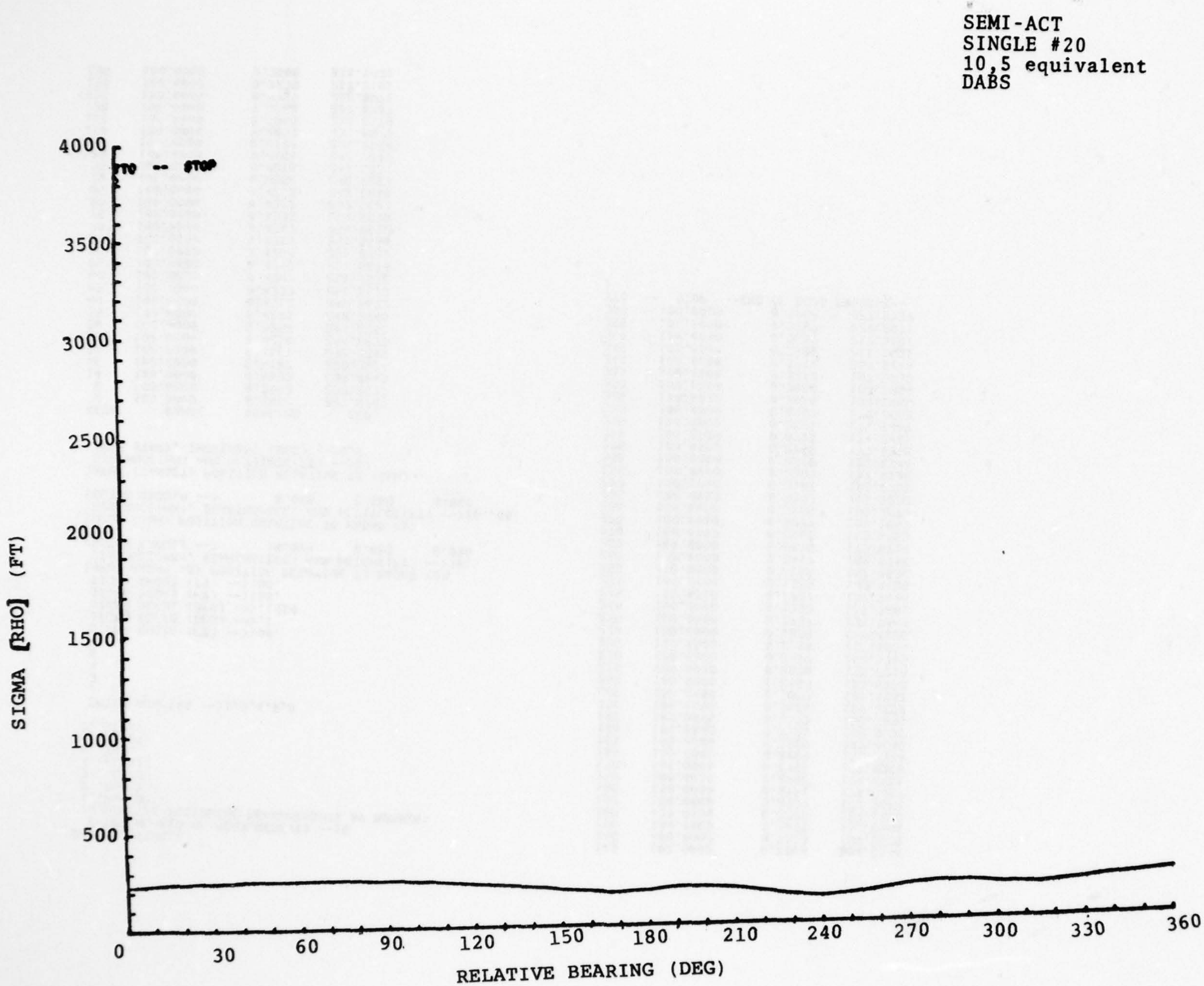
```
PUN DK1:$INGLE
  ENTEP NUMBER OF MEASUREMENTS -->5
 CH??SE THE FOLLOWING MEASUREMENTS BY NUMBER:
 1..RHO10
 2..RHO1T
 3..ALF10
 4..ALFD1
 5..TAU1
 6..RHO0T
 7..PETA

  ENTER NUMBERS -->1,3,4,5,6
  1
  3
  4
  5
  6
  SIGMA RHO10 (FT) -->100.
  SIGMA ALF10 (DEG) -->.1768
  SIGMA ALFD1 (DEG) -->.25
  SIGMA DTOA1 (FT) -->100.
  SIGMA RHO0T (FT) -->100.
 INPUT RADAR <2> POSITION RELATIVE TO RADAR <1>
  DISTANCE(NM), BEARING(DEG) AND HEIGHT(FT) -->50.
 VECTOR RHOV12 -->        50.000     0.000      0.000

 INPUT <OWN> POSITION RELATIVE TO RADAR <1>
  DISTANCE(NM), BEARING(DEG) AND ALTITUDE(FT) -->50.,60.
 VECTOR RHOV10 -->        25.000    43.301      0.000

 INPUT <TARGET> POSITION RELATIVE TO <OWN>
  DISTANCE(NM) AND ALTITUDE(FT) -->10.
  BETA START, INCREMENT (DEG) -->0,5
```

BETA	RANGE	BEARING	CEP
0	100.0000	1.2680	1348.4435
5	100.0000	1.3271	1410.9566
10	100.0000	1.3736	1460.0899
15	100.0000	1.4098	1498.3642
20	100.0000	1.4377	1527.9409
25	100.0000	1.4591	1550.6120
30	100.0000	1.4754	1567.8267
35	100.0000	1.4876	1580.7329
40	100.0000	1.4966	1590.2210
45	100.0000	1.5029	1596.9647
50	100.0000	1.5072	1601.4534
55	100.0000	1.5096	1604.0190
60	100.0000	1.5104	1604.8533
65	100.0000	1.5096	1604.0190
70	100.0000	1.5072	1601.4534
75	100.0000	1.5029	1596.9647
80	100.0000	1.4966	1590.2210
85	100.0000	1.4876	1580.7329
90	100.0000	1.4754	1567.8267
95	100.0000	1.4591	1550.6120
100	100.0000	1.4377	1527.9409
105	100.0000	1.4098	1498.3642
110	100.0000	1.3736	1460.0899
115	100.0000	1.3271	1410.9566
120	100.0000	1.2680	1348.4435
125	100.0000	1.1936	1269.7552
130	100.0000	1.1012	1172.0351
135	100.0000	0.9883	1062.7889
140	100.0000	0.8535	910.6265
145	100.0000	0.6976	746.5193
150	100.0000	0.5255	566.1961
155	100.0000	0.3524	386.8453
160	100.0000	0.2299	263.5509
165	100.0000	0.2673	300.5507
170	100.0000	0.4138	450.0786
175	100.0000	0.5724	615.2263
180	100.0000	0.7129	762.5734
185	100.0000	0.8260	881.6922
190	100.0000	0.9105	970.7359
195	100.0000	0.9688	1032.2149
200	100.0000	1.0053	1070.7885
205	100.0000	1.0252	1091.8053
210	100.0000	1.0333	1100.3944
215	100.0000	1.0339	1100.9937
220	100.0000	1.0303	1097.1822
225	100.0000	1.0251	1091.6874
230	100.0000	1.0202	1086.4738
235	100.0000	1.0167	1082.8502
240	100.0000	1.0155	1081.5619
245	100.0000	1.0167	1082.8502
250	100.0000	1.0202	1086.4738
255	100.0000	1.0251	1091.6874
260	100.0000	1.0303	1097.1822
265	100.0000	1.0339	1100.9937
270	100.0000	1.0333	1100.3944
275	100.0000	1.0252	1091.8053
280	100.0000	1.0053	1070.7885
285	100.0000	0.9688	1032.2149
290	100.0000	0.9105	970.7359
295	100.0000	0.8260	881.6922
300	100.0000	0.7129	762.5734
305	100.0000	0.5724	615.2263
310	100.0000	0.4138	450.0786
315	100.0000	0.2673	300.5507
320	100.0000	0.2299	263.5509
325	100.0000	0.3524	386.8453
330	100.0000	0.5255	566.1961
335	100.0000	0.6976	746.5193
340	100.0000	0.8535	910.6265
345	100.0000	0.9883	1052.7889
350	100.0000	1.1012	1172.0351
355	100.0000	1.1936	1269.7552
360	100.0000	1.2680	1348.4435

```
TT0  --  STOP  --END OF BCAS PROGRAM--
>
```


SINGLE #20
100,20 equivalent
ATCRBS
TO -- STOP
4000
3500
3000
2500
2000
1500
1000
500
0
30
60
90
120
150
180
210
240
270
300
330
360
RELATIVE BEARING (DEG)
SIGMA [RHO] (FT)

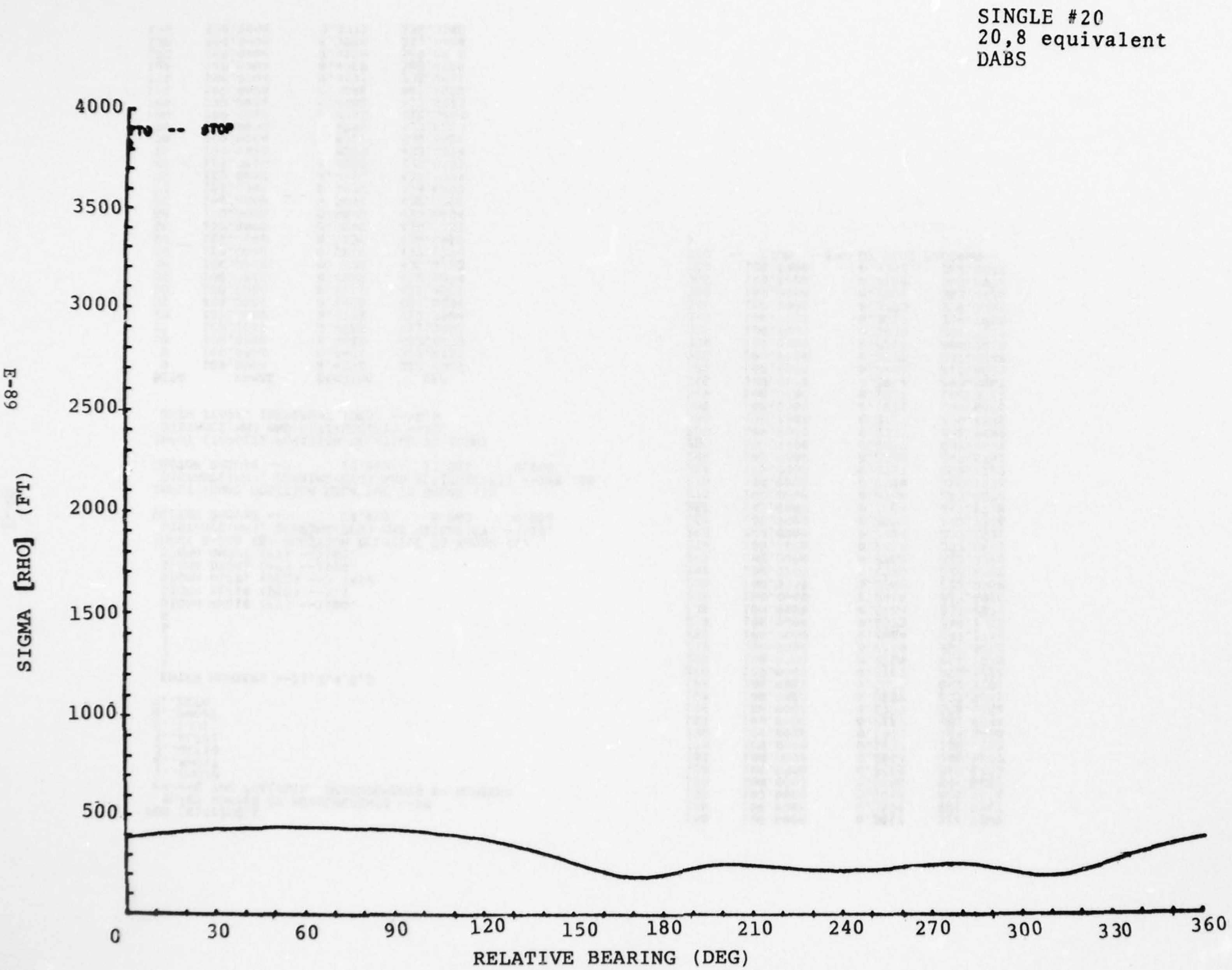
```
RUN DK1:SINGLE
 ENTER NUMBER OF MEASUREMENTS -->5
CHOOSE THE FOLLOWING MEASUREMENTS BY NUMBER:
1..RHO1O
2..RHO1T
3..ALF1O
4..ALFD1
5..TAU1
6..RHODOT
7..BETA
 ENTER NUMBERS -->1,3,4,5,6
 1
 3
 4
 5
 6
 SIGMA RHO1O (FT) -->100.
 SIGMA ALF1O (DEG) -->.1768
 SIGMA ALFD1 (DEG) -->.25
 SIGMA DTOA1 (FT) -->100.
 SIGMA RHODOT (FT) -->100.
INPUT RADAR <2> POSITION RELATIVE TO RADAR <1>
 DISTANCE(NM), BEARING(DEG) AND HEIGHT(FT) -->100.
VECTOR RHOV12 -->       100.000      0.000      0.000

INPUT <OWN> POSITION RELATIVE TO RADAR <1>
 DISTANCE(NM), BEARING(DEG) AND ALTITUDE(FT) -->100.,60.
VECTOR RHOV10 -->        50.000     86.603      0.000

INPUT <TARGET> POSITION RELATIVE TO <OWN>
 DISTANCE(NM) AND ALTITUDE(FT) -->20.
 BETA START, INCREMENT (DEG) -->0,5

BETA      RANGE      BEARING       CEP
  0     100.0000     1.2671    2689.2486
  5     100.0000     1.3264    2815.0736
 10     100.0000     1.3731    2913.9207
 15     100.0000     1.4094    2990.8979
 20     100.0000     1.4374    3050.3719
 25     100.0000     1.4589    3095.9563
 30     100.0000     1.4753    3130.5693
 35     100.0000     1.4875    3156.5204
 40     100.0000     1.4965    3175.6005
 45     100.0000     1.5029    3189.1628
 50     100.0000     1.5072    3198.1911
 55     100.0000     1.5096    3203.3516
 60     100.0000     1.5104    3205.0298
 65     100.0000     1.5096    3203.3516
 70     100.0000     1.5072    3198.1911
 75     100.0000     1.5029    3189.1628
 80     100.0000     1.4965    3175.6005
 85     100.0000     1.4875    3156.5204
 90     100.0000     1.4753    3130.5693
 95     100.0000     1.4589    3095.9563
100     100.0000     1.4374    3050.3719
105     100.0000     1.4094    2990.8979
110     100.0000     1.3731    2913.9207
115     100.0000     1.3264    2815.0736
120     100.0000     1.2671    2689.2486
125     100.0000     1.1923    2530.7506
130     100.0000     1.0993    2333.6986
135     100.0000     0.9856    2092.8183
140     100.0000     0.8496    1804.8098
145     100.0000     0.6917    1470.5711
150     100.0000     0.5161    1099.1742
155     100.0000     0.3357     718.9910
160     100.0000     0.1998     435.3646
165     100.0000     0.2396     517.8889
170     100.0000     0.3959     845.5567
175     100.0000     0.5598    1191.4276
180     100.0000     0.7033    1495.0708
185     100.0000     0.8186    1739.1548
190     100.0000     0.9047    1921.4283
195     100.0000     0.9642    2047.5610
200     100.0000     1.0018    2127.1966
205     100.0000     1.0226    2171.2123
210     100.0000     1.0315    2189.9747
215     100.0000     1.0326    2192.4301
220     100.0000     1.0295    2185.7841
225     100.0000     1.0246    2175.5250
230     100.0000     1.0200    2165.6048
235     100.0000     1.0167    2158.6563
240     100.0000     1.0155    2156.1781
245     100.0000     1.0167    2158.6563
250     100.0000     1.0200    2165.6048
255     100.0000     1.0246    2175.5250
260     100.0000     1.0295    2185.7841
265     100.0000     1.0326    2192.4301
270     100.0000     1.0315    2189.9747
275     100.0000     1.0226    2171.2123
280     100.0000     1.0018    2127.1965
285     100.0000     0.9642    2047.5610
290     100.0000     0.9047    1921.4283
295     100.0000     0.8186    1739.1548
300     100.0000     0.7033    1495.0708
305     100.0000     0.5598    1191.4276
310     100.0000     0.3959     845.5567
315     100.0000     0.2396     517.8889
320     100.0000     0.1998     435.3645
325     100.0000     0.3357     718.9910
330     100.0000     0.5161    1099.1742
335     100.0000     0.6917    1470.5711
340     100.0000     0.8496    1804.8099
345     100.0000     0.9856    2092.8183
350     100.0000     1.0993    2333.6986
355     100.0000     1.1923    2530.7506
360     100.0000     1.2671    2689.2486
TT0  --  STOP  --END OF BCAS PROGRAM--
>
```


SEMI-ACT
SINGLE #20
10,5 equivalent
DABS
SIGMA [RHO] (FT)
4000
3500
3000
2500
2000
1500
1000
500
0
30
60
90
120
150
180
210
240
270
300
330
360
RELATIVE BEARING (DEG)

```
RUN DK1:SINGLE
  ENTER NUMBER OF MEASUREMENTS -->5
 CHOOSE THE FOLLOWING MEASUREMENTS BY NUMBER:
1..RHO10
2..RHO1T
3..ALF10
4..ALFD1
5..TAU1
6..RHO0T
7..BETA

  ENTER NUMBERS -->1,3,4,5,6
  1
  3
  4
  5
  6
  SIGMA RHO10 (FT) -->100.
  SIGMA ALF10 (DEG) -->.1
  SIGMA ALFD1 (DEG) -->.1414
  SIGMA DTOA1 (FT) -->100.
  SIGMA RHO0T (FT) -->100.
 INPUT RADAR (2) POSITION RELATIVE TO RADAR (1)
  DISTANCE(NM), BEARING(DEG) AND HEIGHT(FT) -->10.
 VECTOR RHOV12 -->       10.000      0.000      0.000

 INPUT (OWN) POSITION RELATIVE TO RADAR (1)
  DISTANCE(NM), BEARING(DEG) AND ALTITUDE(FT) -->10.,60.
 VECTOR RHOV10 -->        5.000      8.660      0.000

 INPUT (TARGET) POSITION RELATIVE TO (OWN)
  DISTANCE(NM) AND ALTITUDE(FT) -->5.
  BETA START, INCREMENT (DEG) -->0,5
```

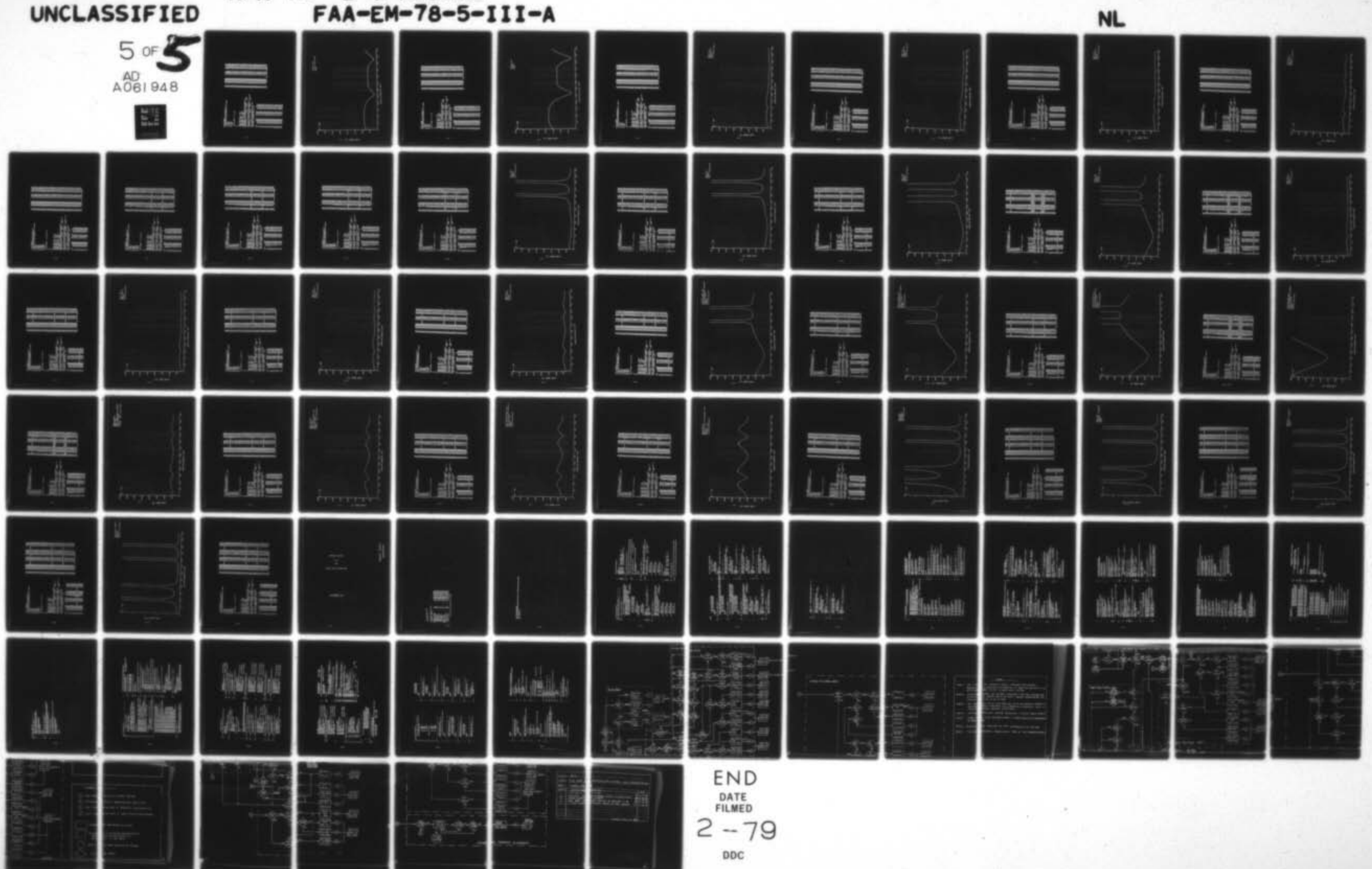
BETA	RANGE	BEARING	CEP
0	100.0000	0.3862	227.8727
5	100.0000	0.3953	232.2579
10	100.0000	0.4033	236.0843
15	100.0000	0.4102	239.3924
20	100.0000	0.4161	242.2249
25	100.0000	0.4210	244.6233
30	100.0000	0.4252	246.6253
35	100.0000	0.4285	248.2640
40	100.0000	0.4312	249.5673
45	100.0000	0.4333	250.5579
50	100.0000	0.4347	251.2532
55	100.0000	0.4355	251.6654
60	100.0000	0.4358	251.8021
65	100.0000	0.4355	251.6654
70	100.0000	0.4347	251.2532
75	100.0000	0.4333	250.5579
80	100.0000	0.4312	249.5673
85	100.0000	0.4285	248.2640
90	100.0000	0.4252	246.6253
95	100.0000	0.4210	244.6233
100	100.0000	0.4161	242.2249
105	100.0000	0.4102	239.3924
110	100.0000	0.4033	236.0843
115	100.0000	0.3953	232.2579
120	100.0000	0.3862	227.8727
125	100.0000	0.3757	222.8971
130	100.0000	0.3639	217.3191
135	100.0000	0.3508	211.1631
140	100.0000	0.3364	204.5144
145	100.0000	0.3213	197.5539
150	100.0000	0.3060	190.5996
155	100.0000	0.2916	184.1450
160	100.0000	0.2797	178.8652
165	100.0000	0.2721	175.5407
170	100.0000	0.2705	174.8481
175	100.0000	0.2755	177.0358
180	100.0000	0.2860	181.6344
185	100.0000	0.2989	187.4146
190	100.0000	0.3106	192.6735
195	100.0000	0.3173	195.7236
200	100.0000	0.3165	195.3672
205	100.0000	0.3073	191.1857
210	100.0000	0.2903	183.5753
215	100.0000	0.2676	173.5714
220	100.0000	0.2417	162.5715
225	100.0000	0.2160	152.0634
230	100.0000	0.1939	143.4185
235	100.0000	0.1787	137.7444
240	100.0000	0.1732	135.7681
245	100.0000	0.1787	137.7444
250	100.0000	0.1939	143.4185
255	100.0000	0.2160	152.0634
260	100.0000	0.2417	162.5715
265	100.0000	0.2676	173.5714
270	100.0000	0.2903	183.5753
275	100.0000	0.3073	191.1857
280	100.0000	0.3165	195.3672
285	100.0000	0.3173	195.7236
290	100.0000	0.3106	192.6735
295	100.0000	0.2989	187.4146
300	100.0000	0.2860	181.6344
305	100.0000	0.2755	177.0358
310	100.0000	0.2705	174.8481
315	100.0000	0.2721	175.5407
320	100.0000	0.2797	178.8652
325	100.0000	0.2916	184.1450
330	100.0000	0.3060	190.5996
335	100.0000	0.3213	197.5539
340	100.0000	0.3364	204.5144
345	100.0000	0.3508	211.1631
350	100.0000	0.3639	217.3191
355	100.0000	0.3757	222.8971
360	100.0000	0.3862	227.8727

```
TT0  --  STOP  --END OF BCAS PROGRAM--
>
```


SINGLE #20
20,8 equivalent
DABS
4000
3500
3000
2500
2000
1500
1000
500
SIGMA [RHO] (FT)
0
30
60
90
120
150
180
210
240
270
300
330
360
RELATIVE BEARING (DEG)

AD-A061 948 FEDERAL AVIATION ADMINISTRATION WASHINGTON D C OFFIC--ETC F/G 17/7
FAA BCAS CONCEPT. VOLUME IIIA. APPENDICES A-E,(U)
APR 78 E J KOENKE
UNCLASSIFIED FAA-EM-78-5-III-A NL

5 OF 5
AD
A061948



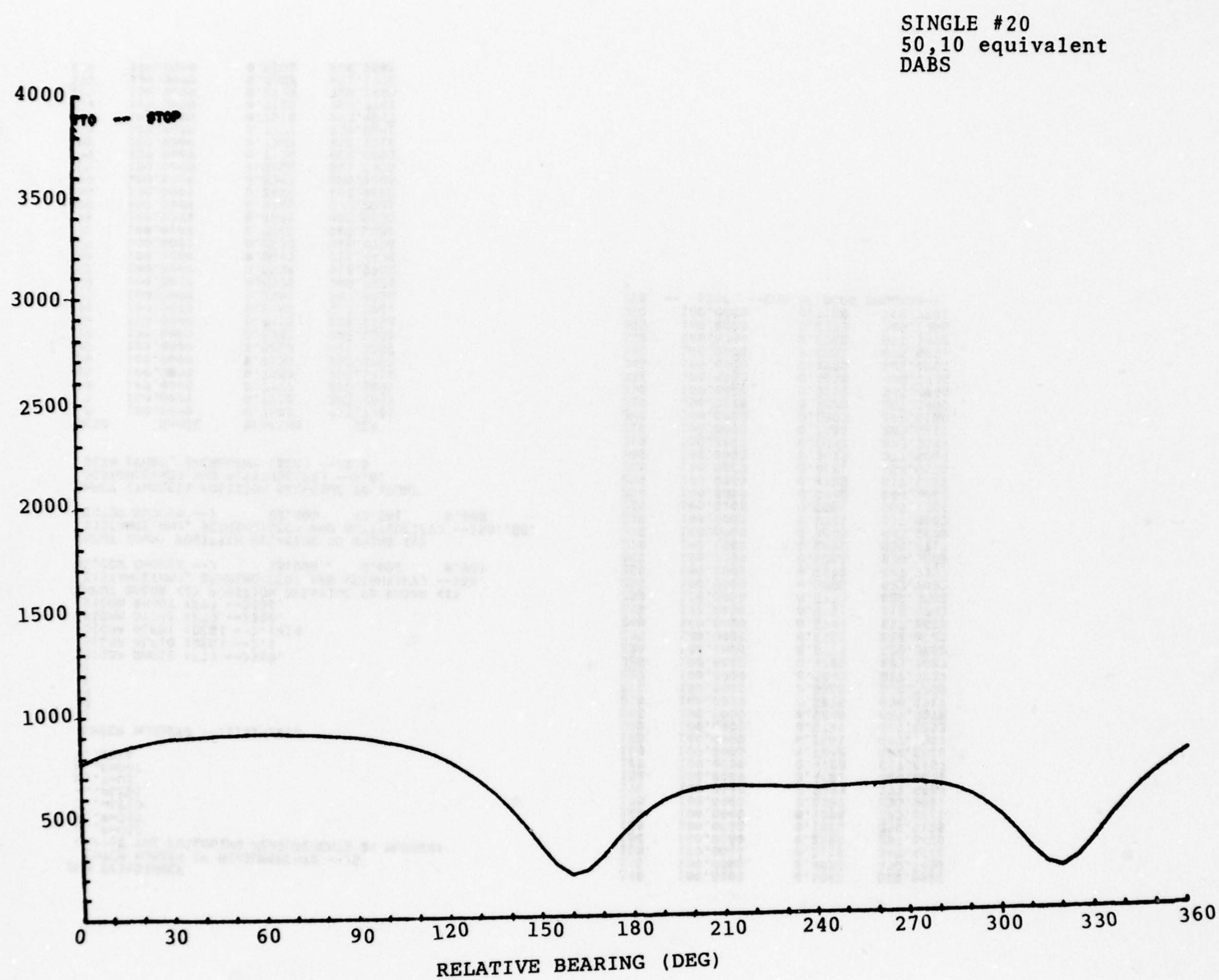
END
DATE
FILMED
2 -- 79
DDC

SIFIED

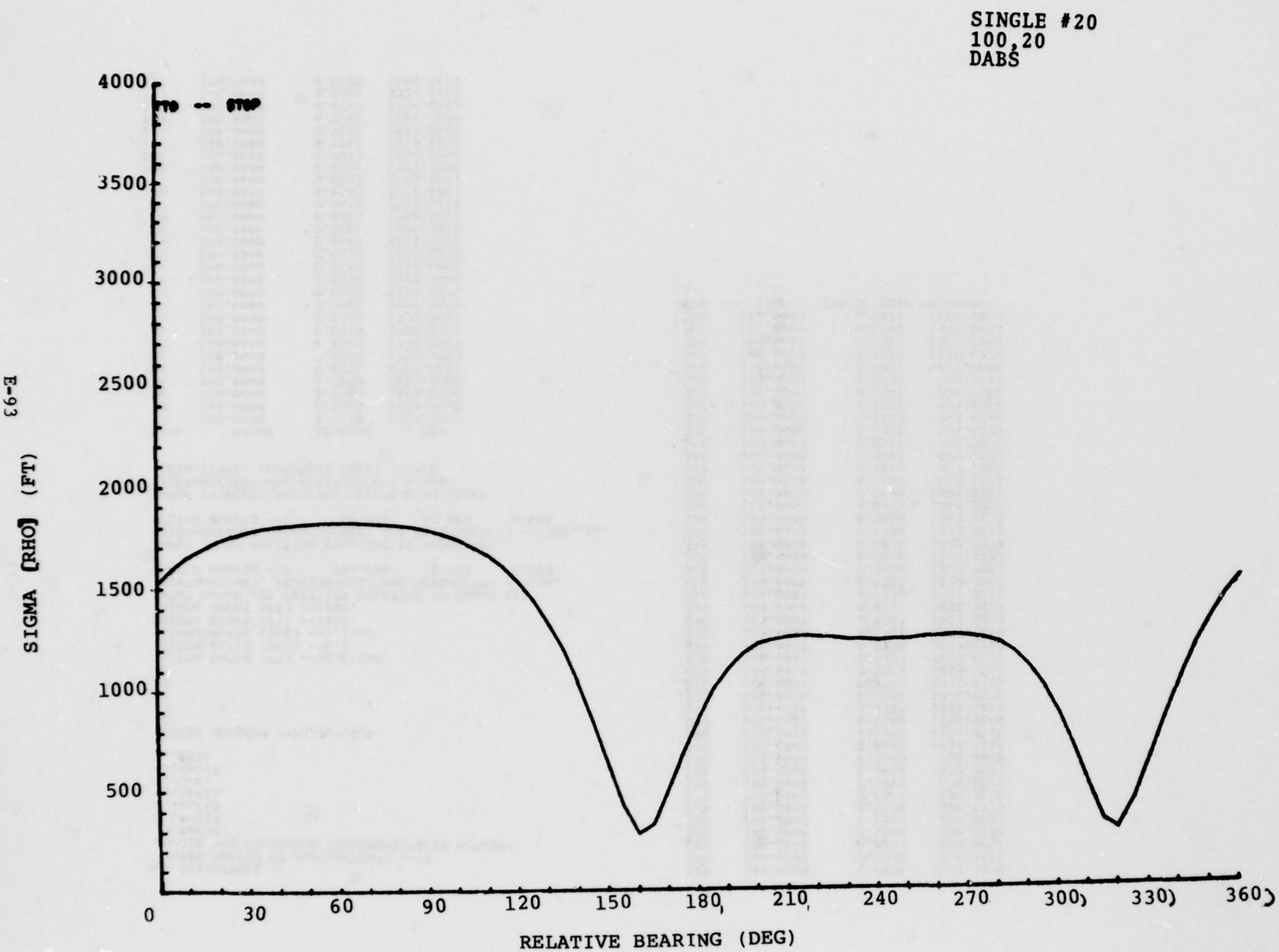
5 OF 5

AD
A061948

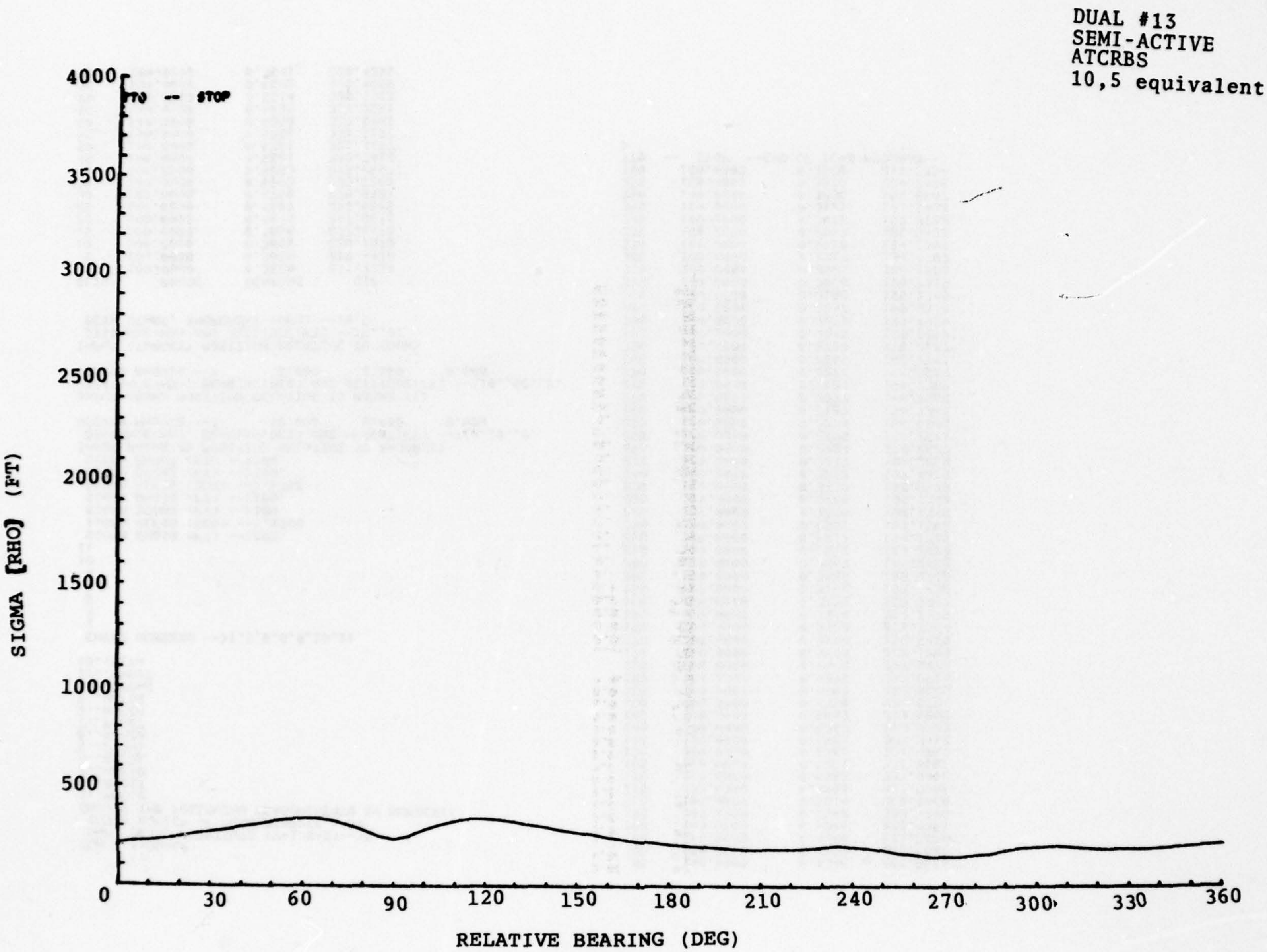
```
RUN DK1:SINGLE
  ENTER NUMBER OF MEASUREMENTS -->5
 CHOOSE THE FOLLOWING MEASUREMENTS BY NUMBER:
 1..RHO10
 2..RHO1T
 3..ALF10
 4..ALFD1
 5..TAU1
 6..RHODT
 7..BETA

 ENTER NUMBERS -->1,3,4,5,6
 1
 3
 4
 5
 6
 SIGMA RHO10 (FT) -->100.
 SIGMA ALF10 (DEG) -->.1
 SIGMA ALFD1 (DEG) -->.1414
 SIGMA DTOA1 (FT) -->100.
 SIGMA RHODT (FT) -->100.
INPUT RADAR <2> POSITION RELATIVE TO RADAR <1>
 DISTANCE(NM), BEARING(DEG) AND HEIGHT(FT) -->20.
VECTOR RHOV12 -->      20.000     0.000     0.000

INPUT <OWN> POSITION RELATIVE TO RADAR <1>
 DISTANCE(NM), BEARING(DEG) AND ALTITUDE(FT) -->20.,60.
VECTOR RHOV10 -->      10.000    17.321     0.000

INPUT <TARGET> POSITION RELATIVE TO <OWN>
 DISTANCE(NM) AND ALTITUDE(FT) -->8.
 BETA START, INCREMENT (DEG) -->0,5

BETA     RANGE      BEARING       CEP
  0    100.0000     0.4352     382.4965
  5    100.0000     0.4491     393.8811
 10    100.0000     0.4608     403.4959
 15    100.0000     0.4706     411.5703
 20    100.0000     0.4788     418.3084
 25    100.0000     0.4855     423.8864
 30    100.0000     0.4911     428.4521
 35    100.0000     0.4955     432.1274
 40    100.0000     0.4990     435.0103
 45    100.0000     0.5016     437.1774
 50    100.0000     0.5036     438.6859
 55    100.0000     0.5045     439.5755
 60    100.0000     0.5049     439.8694
 65    100.0000     0.5045     439.5756
 70    100.0000     0.5036     438.6859
 75    100.0000     0.5016     437.1774
 80    100.0000     0.4990     435.0103
 85    100.0000     0.4955     432.1274
 90    100.0000     0.4911     428.4521
 95    100.0000     0.4855     423.8864
100    100.0000     0.4788     418.3084
105    100.0000     0.4706     411.5703
110    100.0000     0.4608     403.4959
115    100.0000     0.4491     393.8811
120    100.0000     0.4352     382.4965
125    100.0000     0.4188     369.0970
130    100.0000     0.3996     353.4426
135    100.0000     0.3773     335.3388
140    100.0000     0.3517     314.7098
145    100.0000     0.3230     291.7217
150    100.0000     0.2918     266.9810
155    100.0000     0.2596     241.8208
160    100.0000     0.2292     218.6223
165    100.0000     0.2054     200.8867
170    100.0000     0.1937     192.3613
175    100.0000     0.1971     194.8206
180    100.0000     0.2127     206.2848
185    100.0000     0.2337     222.0682
190    100.0000     0.2537     237.3641
195    100.0000     0.2686     248.8701
200    100.0000     0.2767     255.1222
205    100.0000     0.2780     256.1678
210    100.0000     0.2740     253.0272
215    100.0000     0.2664     247.1718
220    100.0000     0.2573     240.1316
225    100.0000     0.2484     233.2571
230    100.0000     0.2410     227.6096
235    100.0000     0.2362     223.9320
240    100.0000     0.2345     222.6588
245    100.0000     0.2362     223.9320
250    100.0000     0.2410     227.6096
255    100.0000     0.2484     233.2571
260    100.0000     0.2573     240.1316
265    100.0000     0.2664     247.1718
270    100.0000     0.2740     253.0272
275    100.0000     0.2780     256.1678
280    100.0000     0.2767     255.1222
285    100.0000     0.2686     248.8701
290    100.0000     0.2537     237.3641
295    100.0000     0.2337     222.0682
300    100.0000     0.2127     206.2848
305    100.0000     0.1971     194.8206
310    100.0000     0.1937     192.3613
315    100.0000     0.2054     200.8867
320    100.0000     0.2292     218.6223
325    100.0000     0.2595     241.8208
330    100.0000     0.2918     266.9810
335    100.0000     0.3230     291.7217
340    100.0000     0.3517     314.7098
345    100.0000     0.3773     335.3388
350    100.0000     0.3996     353.4426
355    100.0000     0.4188     369.0970
360    100.0000     0.4352     382.4965
TT0  --  STOP  --END OF BCAS PROGRAM--
>
```


SINGLE #20
50,10 equivalent
DABS
SIGMA [RHO] (FT)
4000
3500
3000
2500
2000
1500
1000
500
0
30
60
90
120
150
180
210
240
270
300
330
360
RELATIVE BEARING (DEG)

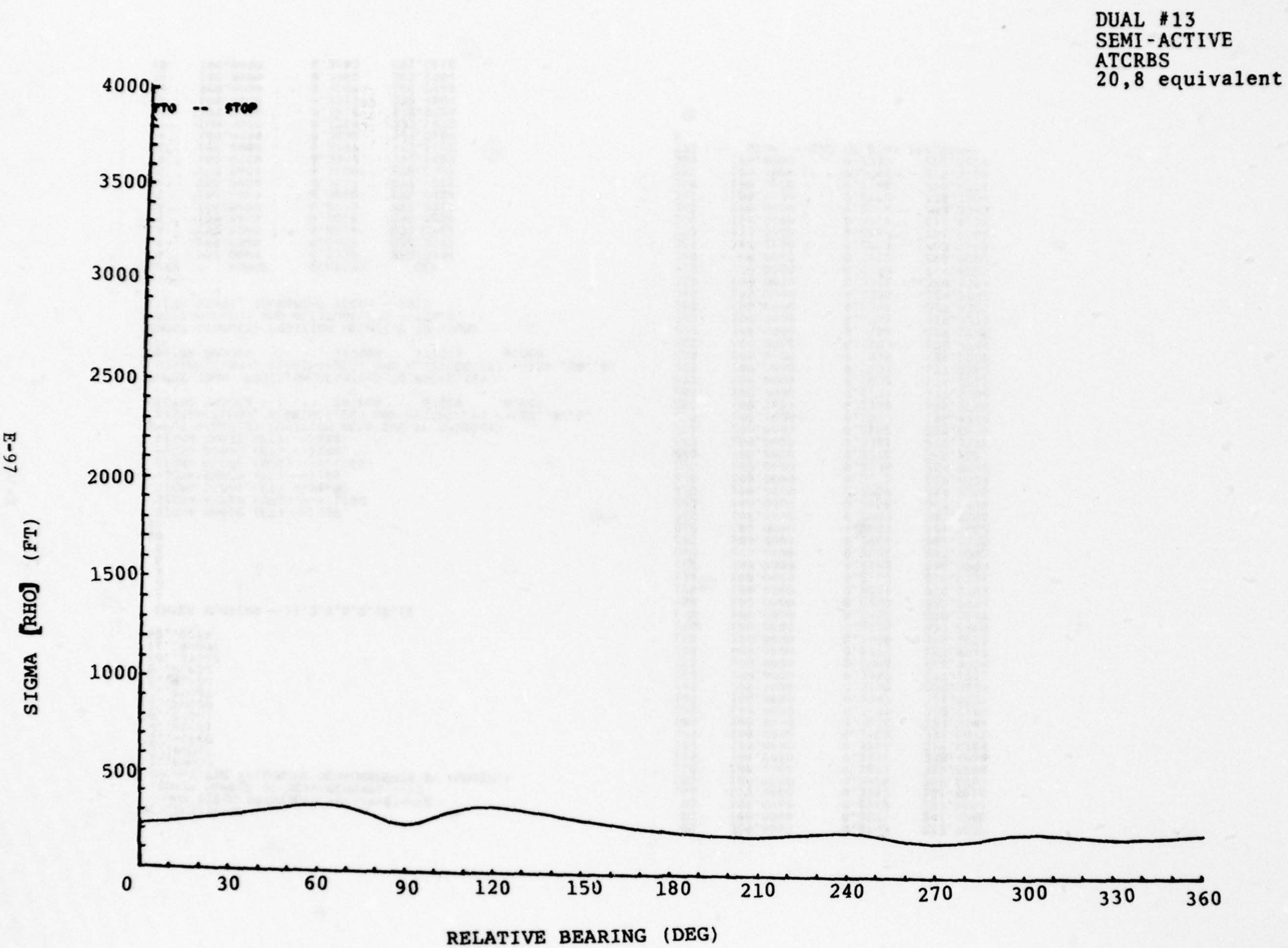
```
RUN DV1:SINGLE
  ENTER NUMBER OF MEASUREMENTS -->5
 CHOOSE THE FOLLOWING MEASUREMENTS BY NUMBER:
1..RHO1O
2..RHO1T
3..ALF1O
4..ALFD1
5..THU1
6..RHOOT
7..BETA

 ENTER NUMBERS -->1,3,4,5,6
1
3
4
5
6
 SIGMA RHO10 (FT) -->100.
 SIGMA ALF10 (DEG) -->.1
 SIGMA ALFD1 (DEG) -->.1414
 SIGMA DTOA1 (FT) -->100.
 SIGMA RHOOT (FT) -->100.
INPUT RADAR (2) POSITION RELATIVE TO RADAR (1)
 DISTANCE(NM), BEARING(DEG) AND HEIGHT(FT) -->50.
VECTOR RHOV12 -->        50.000      0.000      0.000

INPUT (OWN) POSITION RELATIVE TO RADAR (1)
 DISTANCE(NM), BEARING(DEG) AND ALTITUDE(FT) -->50.,60.
VECTOR RHOV10 -->        25.000     43.301      0.000

INPUT (TARGET) POSITION RELATIVE TO (OWN)
 DISTANCE(NM) AND ALTITUDE(FT) -->10.
 BETA START, INCREMENT (DEG) -->0,5

BETA      RANGE      BEARING      CEP
  0     100.0000     0.7188     768.7701
  5     100.0000     0.7518     803.4947
 10     100.0000     0.7777     830.8241
 15     100.0000     0.7980     852.1316
 20     100.0000     0.8136     868.6053
 25     100.0000     0.8256     881.2355
 30     100.0000     0.8347     890.8260
 35     100.0000     0.8415     898.0152
 40     100.0000     0.8465     903.2991
 45     100.0000     0.8501     907.0536
 50     100.0000     0.8525     909.5520
 55     100.0000     0.8538     910.9796
 60     100.0000     0.8543     911.4438
 65     100.0000     0.8538     910.9796
 70     100.0000     0.8525     909.5520
 75     100.0000     0.8501     907.0536
 80     100.0000     0.8465     903.2991
 85     100.0000     0.8415     898.0152
 90     100.0000     0.8347     890.8260
 95     100.0000     0.8256     881.2355
100     100.0000     0.8136     868.6053
105     100.0000     0.7980     852.1316
110     100.0000     0.7777     830.8241
115     100.0000     0.7518     803.4947
120     100.0000     0.7188     768.7701
125     100.0000     0.6773     725.1498
130     100.0000     0.6258     671.1478
135     100.0000     0.5632     606.5691
140     100.0000     0.4889     528.0095
145     100.0000     0.4038     439.7436
150     100.0000     0.3118     345.4840
155     100.0000     0.2239     257.6499
160     100.0000     0.1693     205.5159
165     100.0000     0.1886     223.6211
170     100.0000     0.2607     293.9587
175     100.0000     0.3433     377.5064
180     100.0000     0.4181     454.5576
185     100.0000     0.4789     517.6157
190     100.0000     0.5242     564.8068
195     100.0000     0.5551     597.1364
200     100.0000     0.5741     617.0203
205     100.0000     0.5840     627.3578
210     100.0000     0.5875     630.9717
215     100.0000     0.5868     630.3208
220     100.0000     0.5840     627.3937
225     100.0000     0.5805     623.7083
230     100.0000     0.5773     620.3582
235     100.0000     0.5751     618.0723
240     100.0000     0.5744     617.2655
245     100.0000     0.5751     618.0723
250     100.0000     0.5773     620.3582
255     100.0000     0.5806     623.7083
260     100.0000     0.5840     627.3937
265     100.0000     0.5868     630.3208
270     100.0000     0.5875     630.9717
275     100.0000     0.5840     627.3578
280     100.0000     0.5741     617.0203
285     100.0000     0.5551     597.1364
290     100.0000     0.5242     564.8068
295     100.0000     0.4789     517.6157
300     100.0000     0.4181     454.5576
305     100.0000     0.3433     377.5064
310     100.0000     0.2607     293.9587
315     100.0000     0.1886     223.6211
320     100.0000     0.1693     205.5159
325     100.0000     0.2239     257.6499
330     100.0000     0.3118     345.4840
335     100.0000     0.4038     439.7436
340     100.0000     0.4889     528.0095
345     100.0000     0.5632     606.5691
350     100.0000     0.6258     671.1478
355     100.0000     0.6773     725.1498
360     100.0000     0.7188     768.7701
TT0  --  STOP  --END OF BCAS PROGRAM--
>
```


SINGLE #20
100,20
DABS
SIGMA [RHO] (FT)
4000
3500
3000
2500
2000
1500
1000
500
0
30
60
90
120
150
180
210
240
270
300
330
360
RELATIVE BEARING (DEG)

```
RUN DK1:SINGLE
 ENTEP NUMBER OF MEASUREMENTS -->5
 (HOOSE THE FOLLOWING MEASUREMENTS BY NUMBER:
1..PHO10
2..PHO1T
3..ALF10
4..ALFD1
5..THU1
6..PHOOT
7..BETA

 ENTER NUMBERS -->1,3,4,5,6
 1
 3
 4
 5
 6
 SIGMA RHO10 (FT) -->E\E\100.
 SIGMA ALF10 (DEG) -->.1
 SIGMA ALFD1 (DEG) -->.1414
 SIGMA DTOW1 (FT) -->100.
 SIGMA RHOOT (FT) -->100.
INPUT RADAR <2> POSITION RELATIVE TO RADAR <1>
 DISTANCE(NM), BEARING(DEG) AND HEIGHT(FT) -->100.
VECTOR RHOV12 -->      100.000     0.000     0.000

INPUT <OWN> POSITION RELATIVE TO RADAR <1>
 DISTANCE(NM), BEARING(DEG) AND ALTITUDE(FT) -->100.,60.
VECTOR RHOV10 -->       50.000    86.603     0.000

INPUT <TARGET> POSITION RELATIVE TO <OWN>
 DISTANCE(NM) AND ALTITUDE(FT) -->20.
 BETA START, INCREMENT (DEG) -->0,5

BETA      RANGE       BEARING       CEP
   0    100.0000      0.7170    1524.1024
   5    100.0000      0.7505    1594.9485
  10    100.0000      0.7768    1650.6236
  15    100.0000      0.7973    1693.9900
  20    100.0000      0.8131    1727.4999
  25    100.0000      0.8253    1753.1853
  30    100.0000      0.8345    1772.6887
  35    100.0000      0.8414    1787.3110
  40    100.0000      0.8464    1798.0611
  45    100.0000      0.8501    1805.7019
  50    100.0000      0.8525    1810.7079
  55    100.0000      0.8538    1813.6949
  60    100.0000      0.8543    1814.6402
  65    100.0000      0.8538    1813.6949
  70    100.0000      0.8525    1810.7079
  75    100.0000      0.8501    1805.7019
  80    100.0000      0.8464    1798.0611
  85    100.0000      0.8414    1787.3110
  90    100.0000      0.8345    1772.6887
  95    100.0000      0.8253    1753.1853
 100    100.0000      0.8131    1727.4999
 105    100.0000      0.7973    1693.9900
 110    100.0000      0.7768    1650.6236
 115    100.0000      0.7505    1594.9485
 120    100.0000      0.7170    1524.1024
 125    100.0000      0.6749    1434.9059
 130    100.0000      0.6225    1324.1003
 135    100.0000      0.5585    1188.8174
 140    100.0000      0.4821    1027.4006
 145    100.0000      0.3936     840.7811
 150    100.0000      0.2967     635.0658
 155    100.0000      0.1966     428.8180
 160    100.0000      0.1253     283.9949
 165    100.0000      0.1468     326.9733
 170    100.0000      0.2311     500.3299
 175    100.0000      0.3217     689.5873
 180    100.0000      0.4016     857.7027
 185    100.0000      0.4660     993.3978
 190    100.0000      0.5140    1094.8064
 195    100.0000      0.5472    1164.8705
 200    100.0000      0.5680    1208.9126
 205    100.0000      0.5794    1233.0119
 210    100.0000      0.5841    1242.9879
 215    100.0000      0.5846    1243.8723
 220    100.0000      0.5826    1239.7212
 225    100.0000      0.5797    1233.6255
 230    100.0000      0.5770    1227.8113
 235    100.0000      0.5751    1223.7614
 240    100.0000      0.5744    1222.3202
 245    100.0000      0.5751    1223.7614
 250    100.0000      0.5770    1227.8113
 255    100.0000      0.5797    1233.6255
 260    100.0000      0.5826    1239.7212
 265    100.0000      0.5846    1243.8723
 270    100.0000      0.5841    1242.9879
 275    100.0000      0.5794    1233.0119
 280    100.0000      0.5680    1208.9126
 285    100.0000      0.5472    1164.8705
 290    100.0000      0.5140    1094.8064
 295    100.0000      0.4660     993.3978
 300    100.0000      0.4016     857.7027
 305    100.0000      0.3217     689.5873
 310    100.0000      0.2311     500.3299
 315    100.0000      0.1468     326.9733
 320    100.0000      0.1253     283.9949
 325    100.0000      0.1966     428.8180
 330    100.0000      0.2967     635.0658
 335    100.0000      0.3936     840.7811
 340    100.0000      0.4821    1027.4006
 345    100.0000      0.5585    1188.8174
 350    100.0000      0.6225    1324.1003
 355    100.0000      0.6749    1434.9059
 360    100.0000      0.7170    1524.1024
TT0  --  STOP  --END OF BCAS PROGRAM--
>
```

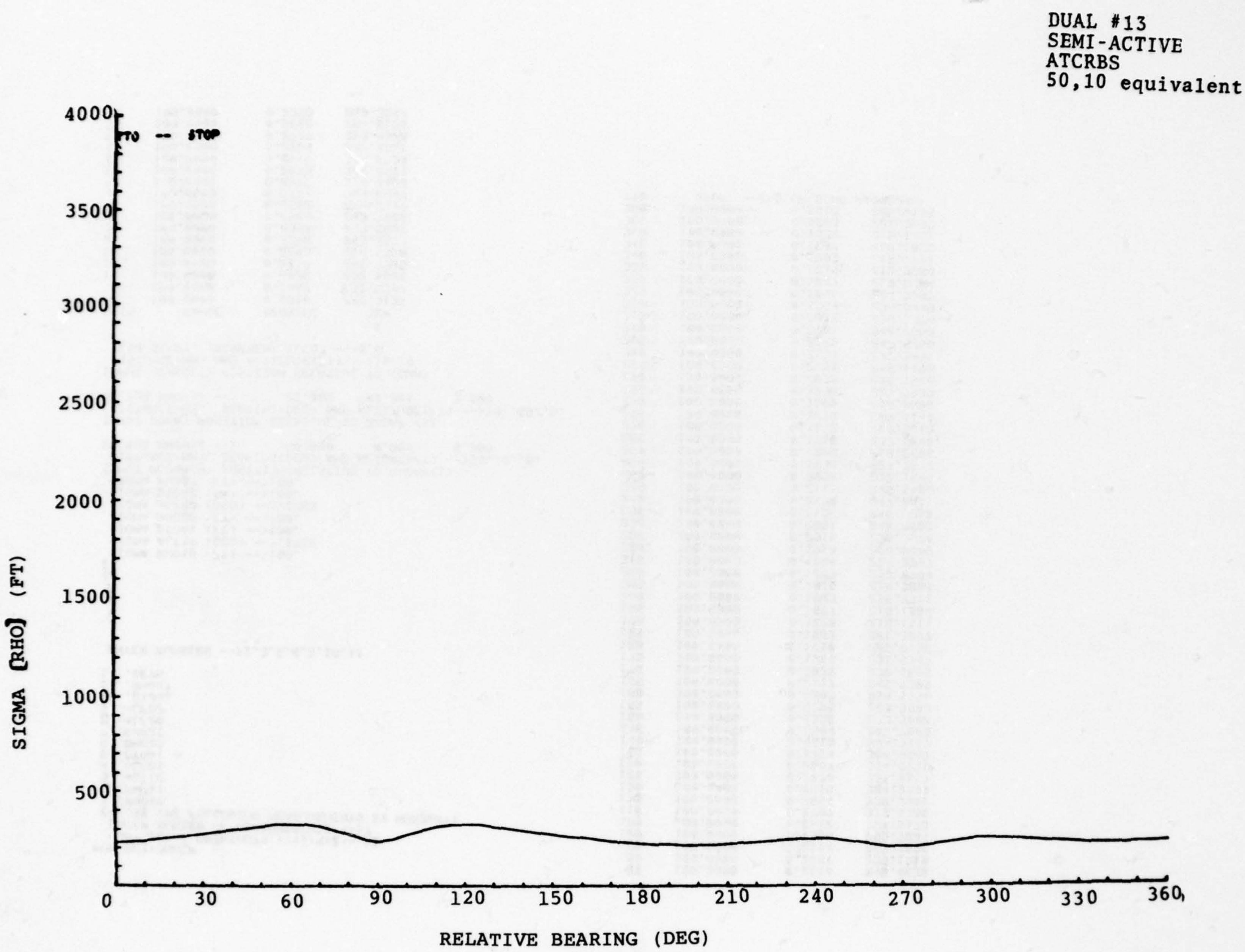

DUAL #13
SEMI-ACTIVE
ATCRBS
10,5 equivalent
FTO -- STOP
SIGMA [RHO] (FT)
4000
3500
3000
2500
2000
1500
1000
500
0
30
60
90
120
150
180
210
240
270
300
330
360
RELATIVE BEARING (DEG)

```
>RUN D1:1:DUMLP
 UNIT DEBUG PRINTOUTS (Y=1.N=2)-->2
 ENTER NUMBER OF MEASUREMENTS -->7
 CHOOSE THE FOLLOWING MEASUREMENTS BY NUMBER::
1..RHO10
2..RHO1T
3..ALF10
4..ALFD1
5..DTOA1
6..RHO20
7..RHO2T
8..ALF20
9..ALFD2
10..DTOA2
11..RHO0T
12..BETA

 ENTER NUMBERS -->1,3,5,6,8,10,11
 1
 3
 5
 6
 8
10
11
 SIGMA RHO10 (FT) -->100.
 SIGMA ALF10 (DEG) -->.1768
 SIGMA DTOA1 (FT) -->100.
 SIGMA RHO20 (FT) -->100.
 SIGMA ALF20 (DEG) -->.1768
 SIGMA DTOA2 (FT) -->100.
 SIGMA RHO0T (FT) -->100.
INPUT RADAR(2) POSITION RELATIVE TO RADAR(1)
 DISTANCE(NM), BEARING(DEG) AND HEIGHT(FT) -->10.,0.,0.
VECTOR RHOV12 -->        10.000     0.000     0.000

INPUT (OWN) POSITION RELATIVE TO RADAR (1)
 DISTANCE(NM), BEARING(DEG) AND ALTITUDE(FT) -->10.,60.,0.
VECTOR RHOV10 -->         5.000     8.660     0.000

INPUT (TARGET) POSITION RELATIVE TO (OWN)
 DISTANCE(NM) AND ALTITUDE(FT) -->5.,0.
 BETA START, INCREMENT (DEG) -->0,5

BETA      RANGE      BEARING       CEP
  0     100.0000     0.3520     211.7354
  5     100.0000     0.3686     219.5460
 10     100.0000     0.3868     228.1803
 15     100.0000     0.4066     237.6472
 20     100.0000     0.4279     247.9518
 25     100.0000     0.4507     259.0805
 30     100.0000     0.4750     270.9791
 35     100.0000     0.5003     283.5208
 40     100.0000     0.5263     296.4567
 45     100.0000     0.5521     309.3412
 50     100.0000     0.5761     321.4257
 55     100.0000     0.5961     331.5187
 60     100.0000     0.6086     337.8401
 65     100.0000     0.6088     337.9681
 70     100.0000     0.5914     329.1412
 75     100.0000     0.5522     309.4296
 80     100.0000     0.4941     280.4351
 85     100.0000     0.4348     251.2020
 90     100.0000     0.4077     238.1682
 95     100.0000     0.4348     251.2020
100     100.0000     0.4941     280.4351
105     100.0000     0.5522     309.4296
110     100.0000     0.5914     329.1412
115     100.0000     0.6088     337.9681
120     100.0000     0.6086     337.8401
125     100.0000     0.5961     331.5187
130     100.0000     0.5761     321.4257
135     100.0000     0.5521     309.3412
140     100.0000     0.5263     296.4567
145     100.0000     0.5003     283.5208
150     100.0000     0.4750     270.9791
155     100.0000     0.4507     259.0805
160     100.0000     0.4279     247.9518
165     100.0000     0.4066     237.6472
170     100.0000     0.3868     228.1803
175     100.0000     0.3686     219.5460
180     100.0000     0.3520     211.7354
185     100.0000     0.3370     204.7476
190     100.0000     0.3236     198.6007
195     100.0000     0.3121     193.3438
200     100.0000     0.3026     189.0722
205     100.0000     0.2957     185.9462
210     100.0000     0.2918     184.2080
215     100.0000     0.2917     184.1767
220     100.0000     0.2961     186.1566
225     100.0000     0.3050     190.1315
230     100.0000     0.3160     195.1340
235     100.0000     0.3237     198.6570
240     100.0000     0.3210     197.4029
245     100.0000     0.3045     189.9259
250     100.0000     0.2784     178.2887
255     100.0000     0.2505     166.2541
260     100.0000     0.2274     156.6604
265     100.0000     0.2127     150.7367
270     100.0000     0.2077     148.7588
275     100.0000     0.2127     150.7367
280     100.0000     0.2274     156.6604
285     100.0000     0.2505     166.2541
290     100.0000     0.2784     178.2887
295     100.0000     0.3045     189.9259
300     100.0000     0.3210     197.4029
305     100.0000     0.3237     198.6570
310     100.0000     0.3160     195.1340
315     100.0000     0.3050     190.1315
320     100.0000     0.2961     186.1566
325     100.0000     0.2917     184.1767
330     100.0000     0.2918     184.2080
335     100.0000     0.2957     185.9462
340     100.0000     0.3026     189.0722
345     100.0000     0.3121     193.3438
350     100.0000     0.3236     198.6007
355     100.0000     0.3370     204.7476
360     100.0000     0.3520     211.7354
TTO  --  STOP  --END OF BCAS PROGRAM--
>
```



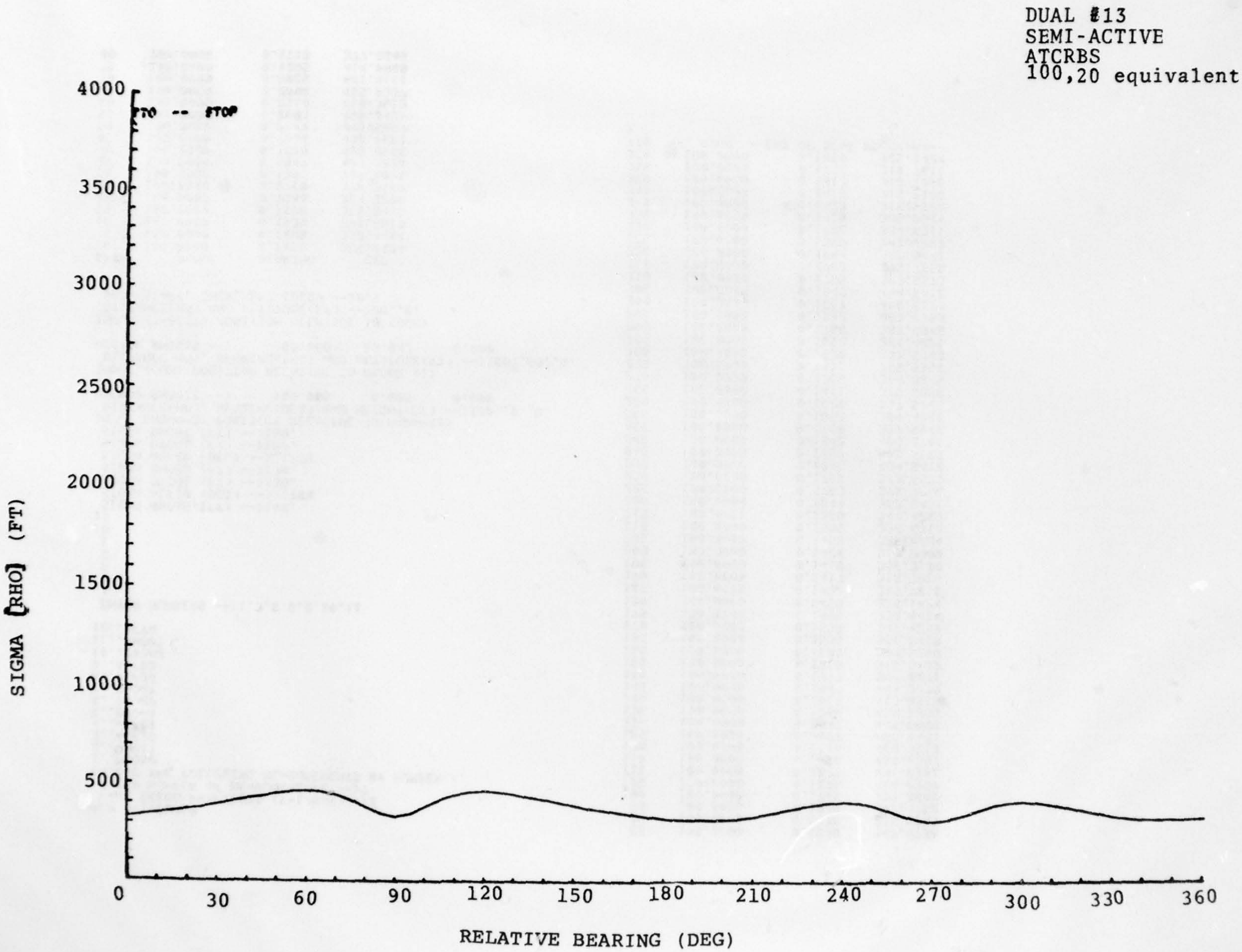
DUAL #13
SEMI-ACTIVE
ATCRBS
20,8 equivalent
SIGMA [RHO] (FT)
4000
3500
3000
2500
2000
1500
1000
500
0
30
60
90
120
150
180
210
240
270
300
330
360
RELATIVE BEARING (DEG)

```
RUN BCI:BCWLP
 WANT DEBUG PRINTOUTS (Y=1/N=2)-->2
 ENTER NUMBER OF MEASUREMENTS -->7
 CHOOSE THE FOLLOWING MEASUREMENTS BY NUMBER::
 1..RHO1O
 2..RHO1T
 3..ALF1O
 4..ALFD1
 5..DTOA1
 6..RHO2O
 7..RHO2T
 8..ALF2O
 9..ALFD2
 10..DTOA2
 11..RHOOT
 12..BETA

 ENTER NUMBERS -->1,3,5,6,8,10,11
 1
 3
 5
 6
 8
 10
 11
  SIGMA RHO1O (FT) -->100.
  SIGMA ALF1O (DEG) -->.1768
  SIGMA DTOA1 (FT) -->100.
  SIGMA RHO2O (FT) -->100.
  SIGMA ALF2O (DEG) -->.1768
  SIGMA DTOA2 (FT) -->100.
  SIGMA RHOOT (FT) -->100.
 INPUT RADAR(2) POSITION RELATIVE TO RADAR(1)
  DISTANCE(NM), BEARING(DEG) AND HEIGHT(FT) -->20.,0.,0.
 VECTOR RHOV12 -->        20.000       0.000       0.000

 INPUT <OWN> POSITION RELATIVE TO RADAR (1)
  DISTANCE(NM), BEARING(DEG) AND ALTITUDE(FT) -->20.,60.,0.
 VECTOR RHOV1O -->        10.000      17.321       0.000

 INPUT <TARGET> POSITION RELATIVE TO <OWN>
  DISTANCE(NM) AND ALTITUDE(FT) -->8.,0.
  BETA START, INCREMENT (DEG) -->0,5

 BETA      RANGE        BEARING       CEP
  0     100.0000      0.2339      222.2074
  5     100.0000      0.2432      229.3047
  10    100.0000      0.2536      237.2468
  15    100.0000      0.2650      246.0250
  20    100.0000      0.2773      255.6317
  25    100.0000      0.2906      266.0434
  30    100.0000      0.3047      277.1981
  35    100.0000      0.3196      288.9624
  40    100.0000      0.3347      301.0827
  45    100.0000      0.3497      313.1126
  50    100.0000      0.3636      324.3104
  55    100.0000      0.3750      333.5078
  60    100.0000      0.3818      338.9784
  65    100.0000      0.3811      338.4064
  70    100.0000      0.3697      329.2080
  75    100.0000      0.3455      309.6904
  80    100.0000      0.3103      281.6212
  85    100.0000      0.2749      253.7067
  90    100.0000      0.2591      241.4746
  95    100.0000      0.2749      253.7667
  100   100.0000      0.3103      281.6218
  105   100.0000      0.3455      309.6904
  110   100.0000      0.3697      329.2080
  115   100.0000      0.3811      338.4064
  120   100.0000      0.3818      338.9784
  125   100.0000      0.3750      333.5078
  130   100.0000      0.3636      324.3104
  135   100.0000      0.3497      313.1126
  140   100.0000      0.3347      301.0827
  145   100.0000      0.3196      288.9624
  150   100.0000      0.3047      277.1981
  155   100.0000      0.2906      266.0434
  160   100.0000      0.2773      255.6317
  165   100.0000      0.2650      246.0250
  170   100.0000      0.2536      237.2468
  175   100.0000      0.2432      229.3047
  180   100.0000      0.2339      222.2074
  185   100.0000      0.2256      215.9789
  190   100.0000      0.2186      210.6731
  195   100.0000      0.2128      206.3894
  200   100.0000      0.2086      203.2903
  205   100.0000      0.2064      201.6138
  210   100.0000      0.2064      201.6662
  215   100.0000      0.2093      203.7558
  220   100.0000      0.2150      208.0080
  225   100.0000      0.2230      214.0205
  230   100.0000      0.2316      220.4584
  235   100.0000      0.2376      224.9842
  240   100.0000      0.2376      225.0385
  245   100.0000      0.2301      219.3370
  250   100.0000      0.2162      208.8835
  255   100.0000      0.1993      196.4744
  260   100.0000      0.1838      185.2590
  265   100.0000      0.1731      177.6382
  270   100.0000      0.1692      174.9591
  275   100.0000      0.1731      177.6382
  280   100.0000      0.1838      185.2590
  285   100.0000      0.1993      196.4744
  290   100.0000      0.2162      208.8835
  295   100.0000      0.2301      219.3370
  300   100.0000      0.2376      225.0365
  305   100.0000      0.2376      224.9842
  310   100.0000      0.2316      220.4584
  315   100.0000      0.2230      214.0205
  320   100.0000      0.2150      208.0080
  325   100.0000      0.2093      203.7558
  330   100.0000      0.2064      201.6662
  335   100.0000      0.2064      201.6138
  340   100.0000      0.2086      203.2903
  345   100.0000      0.2128      206.3894
  350   100.0000      0.2186      210.6731
  355   100.0000      0.2256      215.9789
  360   100.0000      0.2339      222.2074
TT0  --  STOP  --END OF BCAS PROGRAM--
>
```



DUAL #13
SEMI-ACTIVE
ATCRBS
50,10 equivalent
FTO -- STOP
4000
3500
3000
2500
2000
1500
1000
500
0
30
60
90
120
150
180
210
240
270
300
330
360
SIGMA [RHO] (FT)
RELATIVE BEARING (DEG)

```
RUN DK1:DUMLP
 WANT DEBUG PRINTOUTS (Y=1/N=2)-->2
 ENTER NUMBER OF MEASUREMENTS -->7
CHOOSE THE FOLLOWING MEASUREMENTS BY NUMBER::
1..RHO10
2..RHO1T
3..ALF10
4..ALFD1
5..DTOA1
6..RHO20
7..RHO2T
8..ALF20
9..ALFD2
10..DTOA2
11..RHO0T
12..BETH

 ENTER NUMBERS -->1,3,5,6,8,10,11
 1
 3
 5
 6
 8
 10
 11
 SIGMA RHO10 (FT) -->100.
 SIGMA ALF10 (DEG) -->.1768
 SIGMA DTOA1 (FT) -->100.
 SIGMA RHO20 (FT) -->100.
 SIGMA ALF20 (DEG) -->.1768
 SIGMA DTOA2 (FT) -->100.
 SIGMA RHO0T (FT) -->100.
INPUT RADAR<2> POSITION RELATIVE TO RADAR<1>
 DISTANCE(NM), BEARING(DEG) AND HEIGHT(FT) -->50.,0.,0.
VECTOR RHOV12 -->        50.000     0.000     0.000

INPUT <OWN> POSITION RELATIVE TO RADAR <1>
 DISTANCE(NM), BEARING(DEG) AND ALTITUDE(FT) -->50.,60.,0.
VECTOR RHOV10 -->        25.000    43.301     0.000

INPUT <TARGET> POSITION RELATIVE TO <OWN>
 DISTANCE(NM) AND ALTITUDE(FT) -->10.,0.
 BETA STAPT, INCREMENT (DEG) -->0,5

BETA     RANGE      BEARING      CEP
 0     100.0000     0.1910    225.9135
 5     100.0000     0.1969    231.5347
 10    100.0000     0.2038    238.1685
 15    100.0000     0.2117    245.7385
 20    100.0000     0.2203    254.1750
 25    100.0000     0.2298    263.3993
 30    100.0000     0.2398    273.3002
 35    100.0000     0.2504    283.7008
 40    100.0000     0.2610    294.3117
 45    100.0000     0.2714    304.6647
 50    100.0000     0.2807    314.0238
 55    100.0000     0.2879    321.2817
 60    100.0000     0.2915    324.8730
 65    100.0000     0.2894    322.8061
 70    100.0000     0.2797    313.0308
 75    100.0000     0.2612    294.5176
 80    100.0000     0.2359    269.3904
 85    100.0000     0.2114    245.4638
 90    100.0000     0.2007    235.1710
 95    100.0000     0.2114    245.4638
100    100.0000     0.2359    269.3904
105    100.0000     0.2612    294.5176
110    100.0000     0.2797    313.0308
115    100.0000     0.2894    322.8061
120    100.0000     0.2915    324.8730
125    100.0000     0.2879    321.2817
130    100.0000     0.2807    314.0238
135    100.0000     0.2714    304.6647
140    100.0000     0.2610    294.3117
145    100.0000     0.2504    283.7008
150    100.0000     0.2398    273.3002
155    100.0000     0.2298    263.3993
160    100.0000     0.2203    254.1750
165    100.0000     0.2117    245.7385
170    100.0000     0.2038    238.1685
175    100.0000     0.1969    231.5347
180    100.0000     0.1910    225.9135
185    100.0000     0.1863    221.3997
190    100.0000     0.1828    218.1111
195    100.0000     0.1807    216.1865
200    100.0000     0.1803    215.7711
205    100.0000     0.1816    216.9860
210    100.0000     0.1847    219.8764
215    100.0000     0.1894    224.3397
220    100.0000     0.1954    230.0409
225    100.0000     0.2019    236.3374
230    100.0000     0.2081    242.2502
235    100.0000     0.2125    246.5266
240    100.0000     0.2138    247.8411
245    100.0000     0.2111    245.1496
250    100.0000     0.2038    238.1540
255    100.0000     0.1930    227.7539
260    100.0000     0.1808    216.2696
265    100.0000     0.1710    207.1140
270    100.0000     0.1672    203.5912
275    100.0000     0.1710    207.1140
280    100.0000     0.1808    216.2696
285    100.0000     0.1930    227.7539
290    100.0000     0.2038    238.1540
295    100.0000     0.2111    245.1496
300    100.0000     0.2138    247.8411
305    100.0000     0.2125    246.5266
310    100.0000     0.2081    242.2502
315    100.0000     0.2019    236.3374
320    100.0000     0.1954    230.0409
325    100.0000     0.1894    224.3397
330    100.0000     0.1847    219.6764
335    100.0000     0.1816    216.9860
340    100.0000     0.1803    215.7711
345    100.0000     0.1807    216.1865
350    100.0000     0.1828    218.1111
355    100.0000     0.1863    221.3997
360    100.0000     0.1910    225.9135
TT0 --  STOP  --END OF BCAS PROGRAM--
>
```


DUAL #13
SEMI-ACTIVE
ATCRBS
100,20 equivalent
STO -- STOP
SIGMA [RHO] (FT)
4000
3500
3000
2500
2000
1500
1000
500
0
30
60
90
120
150
180
210
240
270
300
330
360
RELATIVE BEARING (DEG)

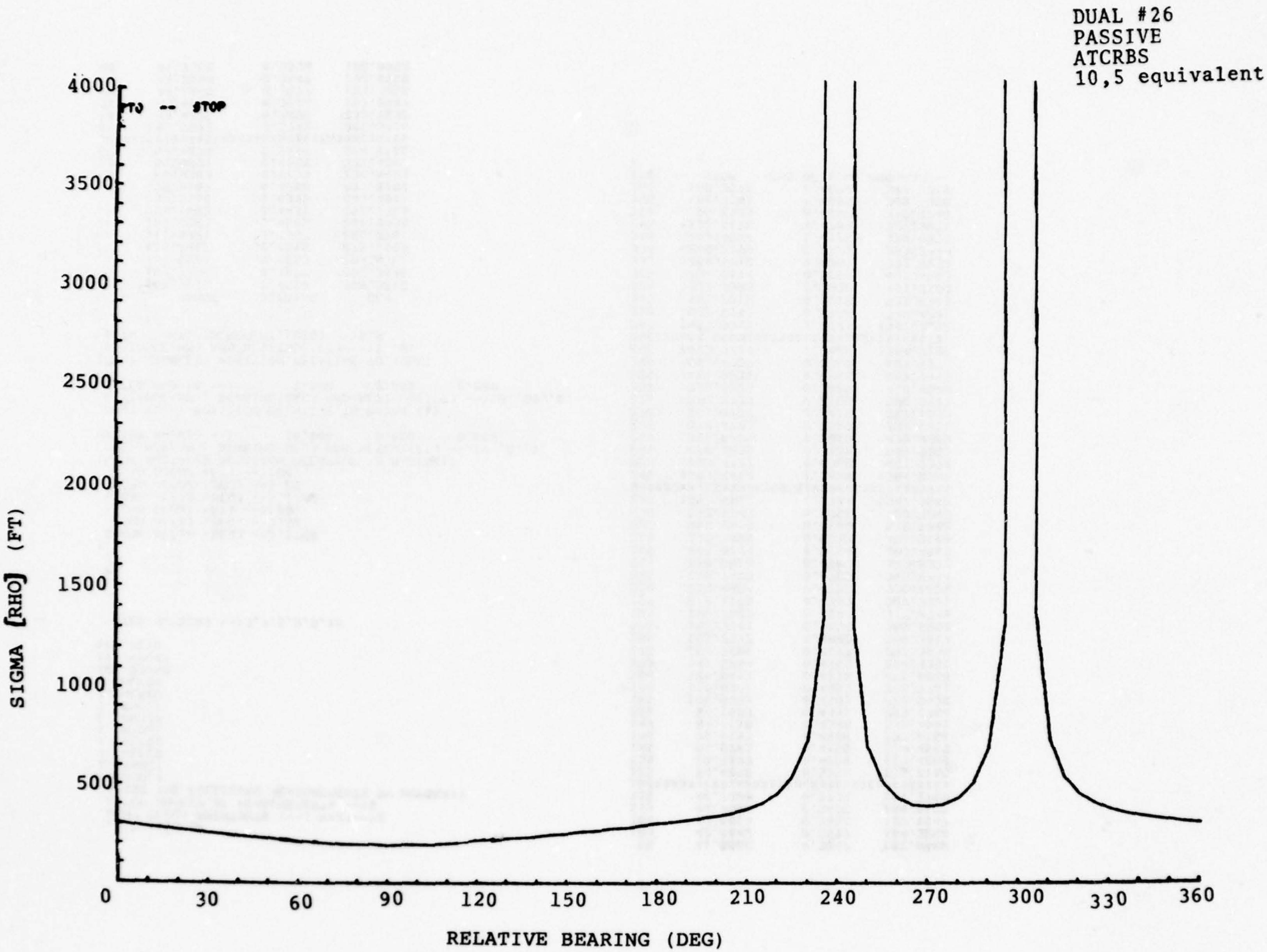
```
>RUN DX1:DUALP
 WANT DEBUG PRINTOUTS (Y=1/N=2)-->2
 ENTER NUMBER OF MEASUREMENTS -->7
CHOOSE THE FOLLOWING MEASUREMENTS BY NUMBER::
1..RHO10
2..RHO1T
3..ALF10
4..ALFD1
5..DTOA1
6..RHO20
7..RHO2T
8..ALF20
9..ALFD2
10..DTOA2
11..RHO0T
12..BETA

 ENTER NUMBERS -->1,3,5,6,8,10,11
 1
 3
 5
 6
 8
 10
 11
 SIGMA RHO10 (FT) -->100.
 SIGMA ALF10 (DEG) -->.1768
 SIGMA DTOA1 (FT) -->100.
 SIGMA RHO20 (FT) -->100.
 SIGMA ALF20 (DEG) -->.1768
 SIGMA DTOA2 (FT) -->100.
 SIGMA RHO0T (FT) -->100.
INPUT RADAR(2) POSITION RELATIVE TO RADAR(1)
 DISTANCE(NM), BEARING(DEG) AND HEIGHT(FT) -->100.,0.,0.
VECTOR RHOV12 -->      100.000      0.000      0.000

INPUT (OWN) POSITION RELATIVE TO RADAR (1)
 DISTANCE(NM), BEARING(DEG) AND ALTITUDE(FT) -->100.,60.,0.
VECTOR RHOV10 -->       50.000     86.603      0.000

INPUT (TARGET) POSITION RELATIVE TO (OWN)
 DISTANCE(NM) AND ALTITUDE(FT) -->20.,0.
 BETA START, INCREMENT (DEG) -->0,5

BETA      RANGE       BEARING      CEP
  0    100.0000      0.1459    325.1424
  5    100.0000      0.1495    332.4484
 10    100.0000      0.1539    341.4213
 15    100.0000      0.1590    351.8418
 20    100.0000      0.1648    363.5299
 25    100.0000      0.1710    376.3169
 30    100.0000      0.1777    390.0071
 35    100.0000      0.1847    404.3270
 40    100.0000      0.1918    418.8556
 45    100.0000      0.1986    432.9280
 50    100.0000      0.2047    445.5097
 55    100.0000      0.2093    455.0481
 60    100.0000      0.2114    459.3513
 65    100.0000      0.2096    455.6307
 70    100.0000      0.2025    441.0181
 75    100.0000      0.1895    414.0860
 80    100.0000      0.1718    377.8649
 85    100.0000      0.1549    343.4758
 90    100.0000      0.1476    328.6883
 95    100.0000      0.1549    343.4758
100    100.0000      0.1718    377.8649
105    100.0000      0.1895    414.0860
110    100.0000      0.2025    441.0181
115    100.0000      0.2096    455.6307
120    100.0000      0.2114    459.3513
125    100.0000      0.2093    455.0481
130    100.0000      0.2047    445.5097
135    100.0000      0.1986    432.9280
140    100.0000      0.1918    418.8556
145    100.0000      0.1847    404.3270
150    100.0000      0.1777    390.0071
155    100.0000      0.1710    376.3169
160    100.0000      0.1648    363.5299
165    100.0000      0.1590    351.8418
170    100.0000      0.1539    341.4213
175    100.0000      0.1495    332.4484
180    100.0000      0.1459    325.1424
185    100.0000      0.1432    319.7811
190    100.0000      0.1417    316.7066
195    100.0000      0.1415    316.3109
200    100.0000      0.1428    318.9908
205    100.0000      0.1458    325.0624
210    100.0000      0.1506    334.6311
215    100.0000      0.1569    347.4283
220    100.0000      0.1644    362.6421
225    100.0000      0.1723    378.7856
230    100.0000      0.1795    393.6673
235    100.0000      0.1848    404.5412
240    100.0000      0.1867    408.5173
245    100.0000      0.1842    403.2704
250    100.0000      0.1768    387.9946
255    100.0000      0.1652    364.4221
260    100.0000      0.1520    337.5743
265    100.0000      0.1411    315.5358
270    100.0000      0.1368    306.8875
275    100.0000      0.1411    315.5356
280    100.0000      0.1520    337.5743
285    100.0000      0.1652    364.4221
290    100.0000      0.1768    387.9946
295    100.0000      0.1842    403.2704
300    100.0000      0.1867    408.5173
305    100.0000      0.1848    404.5412
310    100.0000      0.1795    393.6673
315    100.0000      0.1723    378.7856
320    100.0000      0.1644    362.6421
325    100.0000      0.1569    347.4283
330    100.0000      0.1506    334.6311
335    100.0000      0.1458    325.0624
340    100.0000      0.1428    318.9908
345    100.0000      0.1415    316.3109
350    100.0000      0.1417    316.7066
355    100.0000      0.1432    319.7811
360    100.0000      0.1459    325.1424
TT0  --   STOP  --END OF BCAS PROGRAM--
>
```

```
>RUN DK1:DUALP
WANT DEBUG PRINTOUTS (Y=1/N=2)-->2
ENTER NUMBER OF MEASUREMENTS -->6
CHOOSE THE FOLLOWING MEASUREMENTS BY NUMBER::
1..RHO1O
2..RHO1T
3..ALF1O
4..ALFD1
5..DTOA1
6..RHO2O
7..RHO2T
8..ALF2O
9..ALFD2
10..DTOA2
11..RHOOT
12..BETA

ENTER NUMBERS -->1,3,5,6,8,10
1
3
5
6
8
10
SIGMA RHO1O (FT) -->100.
SIGMA ALF1O (DEG) -->.1768
SIGMA DTOA1 (FT) -->100.
SIGMA RHO2O (FT) -->100.
SIGMA ALF2O (DEG) -->.1768
SIGMA DTOA2 (FT) -->100.
INPUT RADAR(2) POSITION RELATIVE TO RADAR(1)
DISTANCE(NM), BEARING(DEG) AND HEIGHT(FT) -->10.,0.,0.
VECTOR RHOV12 -->       10.000      0.000      0.000

INPUT <OWN> POSITION RELATIVE TO RADAR (1)
DISTANCE(NM), BEARING(DEG) AND ALTITUDE(FT) -->10.,60.,0.
VECTOR RHOV1O -->        5.000      8.660      0.000

INPUT <TARGET> POSITION RELATIVE TO <OWN>
DISTANCE(NM) AND ALTITUDE(FT) -->5.,0.
BETA START, INCREMENT (DEG) -->0,5

BETA     RANGE      BEARING      CEP
 0     134.4569     0.4604     278.7045
 5     125.4786     0.4615     275.0117
10     116.6592     0.4615     271.0763
15     108.0621     0.4603     266.9211
20      99.7526     0.4581     262.5914
25      91.7933     0.4550     258.1460
30      84.2420     0.4512     253.6510
35      77.1510     0.4468     249.1757
40      70.5665     0.4421     244.7908
45      64.5285     0.4371     240.5662
50      59.0708     0.4320     236.5697
55      54.2210     0.4271     232.8666
60      50.0000     0.4225     229.5178
65      46.4225     0.4182     226.5795
70      43.4968     0.4146     224.1018
75      41.2256     0.4116     222.1276
80      39.6075     0.4095     220.6918
85      38.6389     0.4081     219.8198
90      38.3165     0.4077     219.5273
95      38.6389     0.4081     219.8198
100     39.6075     0.4095     220.6918
105     41.2256     0.4116     222.1276
110     43.4968     0.4146     224.1018
115     46.4225     0.4182     226.5795
120     50.0000     0.4225     229.5178
125     54.2210     0.4271     232.8666
130     59.0708     0.4320     236.5697
135     64.5285     0.4371     240.5662
140     70.5665     0.4421     244.7908
145     77.1510     0.4468     249.1757
150     84.2420     0.4512     253.6510
155     91.7933     0.4550     258.1460
160     99.7526     0.4581     262.5914
165    108.0621     0.4603     266.9211
170    116.6592     0.4615     271.0763
175    125.4786     0.4615     275.0117
180    134.4569     0.4604     278.7045
185    143.5392     0.4582     282.1709
190    152.6937     0.4549     285.4914
195    161.9366     0.4511     288.8552
200    171.3788     0.4474     292.6381
205    181.3181     0.4449     297.5473
210    192.4277     0.4461     304.9118
215    206.1872     0.4549     317.3234
220    225.9913     0.4797     340.2481
225    260.5599     0.5393     386.8833
230    337.7262     0.6891     497.5748
235    600.5102     1.2007     875.1766
240*************************************
245    600.8165     1.0085     804.3298
250    339.1473     0.4873     426.3631
255    264.3666     0.3244     315.4081
260    234.0093     0.2518     269.4126
265    220.8735     0.2178     249.2543
270    217.1115     0.2077     243.4473
275    220.8735     0.2178     249.2543
280    234.0093     0.2518     269.4126
285    264.3666     0.3244     315.4081
290    339.1473     0.4873     426.3631
295    600.8165     1.0085     804.3298
300*************************************
305    600.5102     1.2007     875.1766
310    337.7262     0.6891     497.5748
315    260.5599     0.5393     386.8833
320    225.9913     0.4797     340.2481
325    206.1872     0.4549     317.3234
330    192.4277     0.4461     304.9118
335    181.3181     0.4449     297.5473
340    171.3788     0.4474     292.6381
345    161.9366     0.4511     288.8552
350    152.6937     0.4549     285.4914
355    143.5392     0.4582     282.1709
360    134.4569     0.4604     278.7045
TT0 --  STOP  --END OF BCAS PROGRAM--
>
```

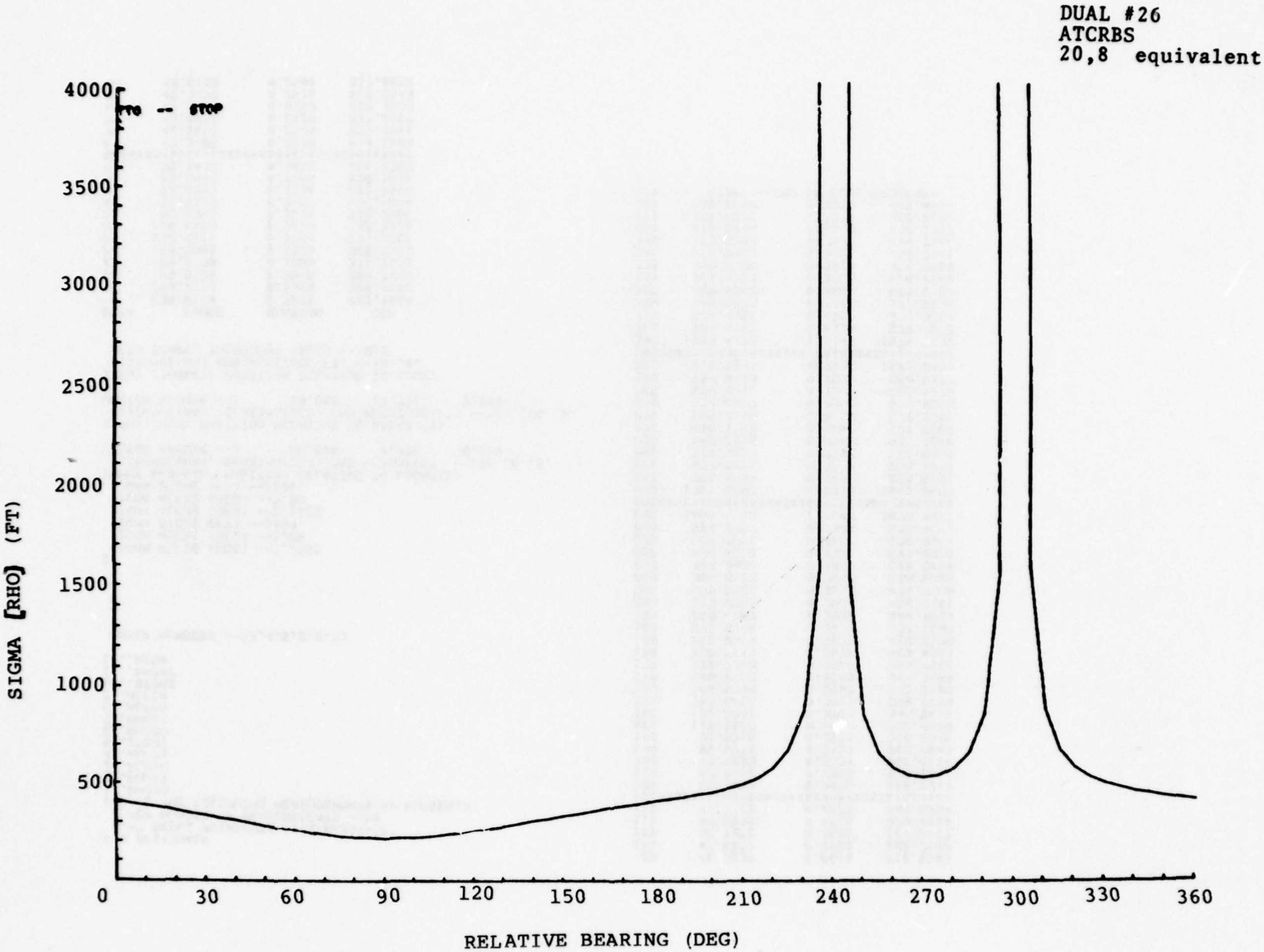
```
:RUN DK1:BCASLP
  WANT DEBUG PRINTOUTS (Y=1/N=2)-->2
  ENTER NUMBER OF MEASUREMENTS -->6
 CHOOSE THE FOLLOWING MEASUREMENTS BY NUMBER::
 1..RHO10
 2..RHO1T
 3..ALF10
 4..ALFD1
 5..DTOA1
 6..RHO20
 7..RHO2T
 8..ALF20
 9..ALFD2
 10..DTOA2
 11..RHOOT
 12..BETA

  ENTER NUMBERS -->1,3,5,6,8,10
  1
  3
  5
  6
  8
 10
  SIGMA RHO10 (FT) -->100.
  SIGMA ALF10 (DEG) -->.1768
  SIGMA DTOA1 (FT) -->100.
  SIGMA RHO20 (FT) -->100.
  SIGMA ALF20 (DEG) -->.1768
  SIGMA DTOA2 (FT) -->100.
 INPUT RADAR(2) POSITION RELATIVE TO RADAR(1)
  DISTANCE(NM), BEARING(DEG) AND HEIGHT(FT) -->20.,0.,0.
 VECTOR RHOV12 -->        20.000     0.000     0.000

 INPUT (OWN) POSITION RELATIVE TO RADAR (1)
  DISTANCE(NM), BEARING(DEG) AND ALTITUDE(FT) -->20.,60.,0.
 VECTOR RHOV10 -->        10.000    17.321     0.000

 INPUT (TARGET) POSITION RELATIVE TO (OWN)
  DISTANCE(NM) AND ALTITUDE(FT) -->8.,0.
  BETA START, INCREMENT (DEG) -->0,5

 BETA     RANGE      BEARING     CEP
   0    173.3892    0.3599    351.1277
   5    159.3464    0.3589    343.6475
  10    145.5824    0.3565    336.6889
  15    132.2129    0.3529    327.2764
  20    119.3627    0.3480    318.4717
  25    107.1605    0.3421    309.3617
  30     95.7361    0.3352    300.0521
  35     85.2179    0.3276    290.6628
  40     75.7308    0.3194    281.3253
  45     67.3906    0.3108    272.1811
  50     60.2930    0.3022    263.3797
  55     54.4967    0.2937    255.0777
  60     50.0000    0.2856    247.4356
  65     46.7215    0.2782    240.6147
  70     44.4985    0.2717    234.7715
  75     43.1109    0.2664    230.0514
  80     42.3256    0.2624    226.5801
  85     41.9429    0.2579    224.4557
  90     41.8306    0.2591    223.7404
  95     41.9429    0.2599    224.4557
 100     42.3256    0.2624    226.5801
 105     43.1109    0.2664    230.0514
 110     44.4985    0.2717    234.7715
 115     46.7215    0.2782    240.6147
 120     50.0000    0.2856    247.4356
 125     54.4967    0.2937    255.0777
 130     60.2930    0.3022    263.3797
 135     67.3906    0.3108    272.1811
 140     75.7308    0.3194    281.3253
 145     85.2179    0.3276    290.6628
 150     95.7361    0.3352    300.0521
 155    107.1606    0.3421    309.3617
 160    119.3627    0.3480    318.4717
 165    132.2129    0.3529    327.2764
 170    145.5824    0.3565    336.6889
 175    159.3464    0.3589    343.6475
 180    173.3892    0.3599    351.1277
 185    187.6149    0.3596    358.1592
 190    201.9641    0.3582    364.8561
 195    216.4463    0.3558    371.4657
 200    231.1969    0.3532    378.4559
 205    246.5895    0.3511    386.6810
 210    263.4677    0.3512    397.7194
 215    283.6844    0.3565    414.6432
 220    311.5219    0.3729    444.0039
 225    358.1642    0.4145    501.9497
 230    460.1318    0.5226    638.9871
 235    808.8133    0.9012   1112.9640
 240*************************************
 245    827.1391    0.7654   1051.5693
 250    482.8501    0.3774    579.3543
 255    387.7170    0.2566    444.6689
 260    350.3190    0.2025    390.1769
 265    334.5268    0.1769    366.6602
 270    330.0630    0.1692    359.9337
 275    334.5268    0.1769    366.6602
 280    350.3190    0.2025    390.1769
 285    387.7170    0.2566    444.6689
 290    482.8501    0.3774    579.3543
 295    827.1391    0.7654   1051.5693
 300*************************************
 305    808.8133    0.9012   1112.9640
 310    460.1318    0.5226    638.9871
 315    358.1642    0.4145    501.9497
 320    311.5219    0.3729    444.0039
 325    283.6844    0.3565    414.6432
 330    263.4677    0.3512    397.7194
 335    246.5895    0.3511    386.6810
 340    231.1969    0.3532    378.4559
 345    216.4463    0.3558    371.4657
 350    201.9641    0.3582    364.8561
 355    187.6149    0.3596    358.1592
 360    173.3892    0.3599    351.1277
 TT0 --  STOP  --END OF BCAS PROGRAM--
 >
```

```
:RUN DK1:DUALP
 WAIT DEBUG PRINTOUTS (Y=1/N=2)-->2
 ENTER NUMBER OF MEASUREMENTS -->6
CHOOSE THE FOLLOWING MEASUREMENTS BY NUMBER::
1..RHO10
2..RHO1T
3..ALF10
4..ALFD1
5..DTOA1
6..RHO20
7..RHO2T
8..ALF20
9..ALFD2
10..DTOA2
11..RHO0T
12..BETA

 ENTER NUMBERS -->1,3,5,6,8,10
 1
 3
 5
 6
 8
10
 SIGMA RHO10 (FT) -->100.
 SIGMA ALF10 (DEG) -->.1768
 SIGMA DTOA1 (FT) -->100.
 SIGMA RHO20 (FT) -->100.
 SIGMA ALF20 (DEG) -->.1768
 SIGMA DTOA2 (FT) -->100.
INPUT RADAR(2) POSITION RELATIVE TO RADAR(1)
 DISTANCE(NM), BEARING(DEG) AND HEIGHT(FT) -->50.,0.,0.
VECTOR RHOV12 -->          50.000     0.000     0.000

INPUT (OWN) POSITION RELATIVE TO RADAR (1)
 DISTANCE(NM), BEARING(DEG) AND ALTITUDE(FT) -->50.,60.,0.
VECTOR RHOV10 -->          25.000    43.301     0.000

INPUT (TARGET) POSITION RELATIVE TO (OWN)
 DISTANCE(NM) AND ALTITUDE(FT) -->10.,0.
 BETA START, INCREMENT (DEG) -->0,5

BETA      RANGE       BEARING      CEP
  0    226.5372      0.3268    414.0478
  5    205.7472      0.3246    401.0580
 10    185.5467      0.3213    387.9577
 15    166.0265      0.3167    374.6651
 20    147.3129      0.3109    361.1584
 25    129.5596      0.3040    347.4616
 30    112.9450      0.2960    333.6362
 35     97.6736      0.2871    319.7757
 40     83.9787      0.2775    306.0034
 45     72.1224      0.2673    292.4709
 50     62.3768      0.2568    279.3583
 55     54.9788      0.2463    266.8734
 60     50.0000      0.2360    255.2504
 65     47.2447      0.2264    244.7461
 70     46.2180      0.2179    235.6319
 75     46.2650      0.2107    228.1798
 80     46.7634      0.2053    222.6423
 85     47.2464      0.2019    219.2273
 90     47.4375      0.2007    218.0728
 95     47.2464      0.2019    219.2273
100     46.7634      0.2053    222.6423
105     46.2650      0.2107    228.1798
110     46.2180      0.2179    235.6319
115     47.2447      0.2264    244.7461
120     50.0000      0.2360    255.2504
125     54.9788      0.2463    266.8734
130     62.3768      0.2568    279.3583
135     72.1224      0.2673    292.4709
140     83.9787      0.2775    306.0034
145     97.6736      0.2871    319.7757
150    112.9450      0.2960    333.6362
155    129.5596      0.3040    347.4616
160    147.3129      0.3109    361.1584
165    166.0265      0.3167    374.6651
170    185.5467      0.3213    387.9577
175    205.7472      0.3246    401.0580
180    226.5372      0.3268    414.0478
185    247.8776      0.3280    427.0925
190    269.8093      0.3283    440.4799
195    292.5048      0.3283    454.6893
200    316.3623      0.3284    470.5166
205    342.1921      0.3298    489.3198
210    371.6114      0.3342    513.5311
215    407.9639      0.3448    547.8360
220    458.7454      0.3679    602.2257
225    543.1740      0.4184    701.3814
230    723.0617      0.5403    922.5477
235   1318.6749      0.9507   1659.9335
240**************************************
245   1380.1195      0.8154   1628.6395
250    795.2699      0.3973    899.9883
255    631.1780      0.2652    691.0126
260    566.4518      0.2050    606.7306
265    539.2557      0.1760    570.6592
270    531.6098      0.1672    560.4091
275    539.2557      0.1760    570.6592
280    566.4518      0.2050    606.7306
285    631.1780      0.2652    691.0126
290    795.2699      0.3973    899.9883
295   1380.1195      0.8154   1628.6395
300**************************************
305   1318.6749      0.9507   1659.9335
310    723.0617      0.5403    922.5477
315    543.1740      0.4184    701.3814
320    458.7454      0.3679    602.2257
325    407.9639      0.3448    547.8360
330    371.6114      0.3342    513.5311
335    342.1921      0.3298    483.3198
340    316.3623      0.3294    470.5166
345    292.5048      0.3253    454.6693
350    269.8093      0.3283    440.4799
355    247.8776      0.3280    427.0926
360    226.5372      0.3268    414.0478
TT0  --  STOP  --END OF BCAS PROGRAM--
>
```

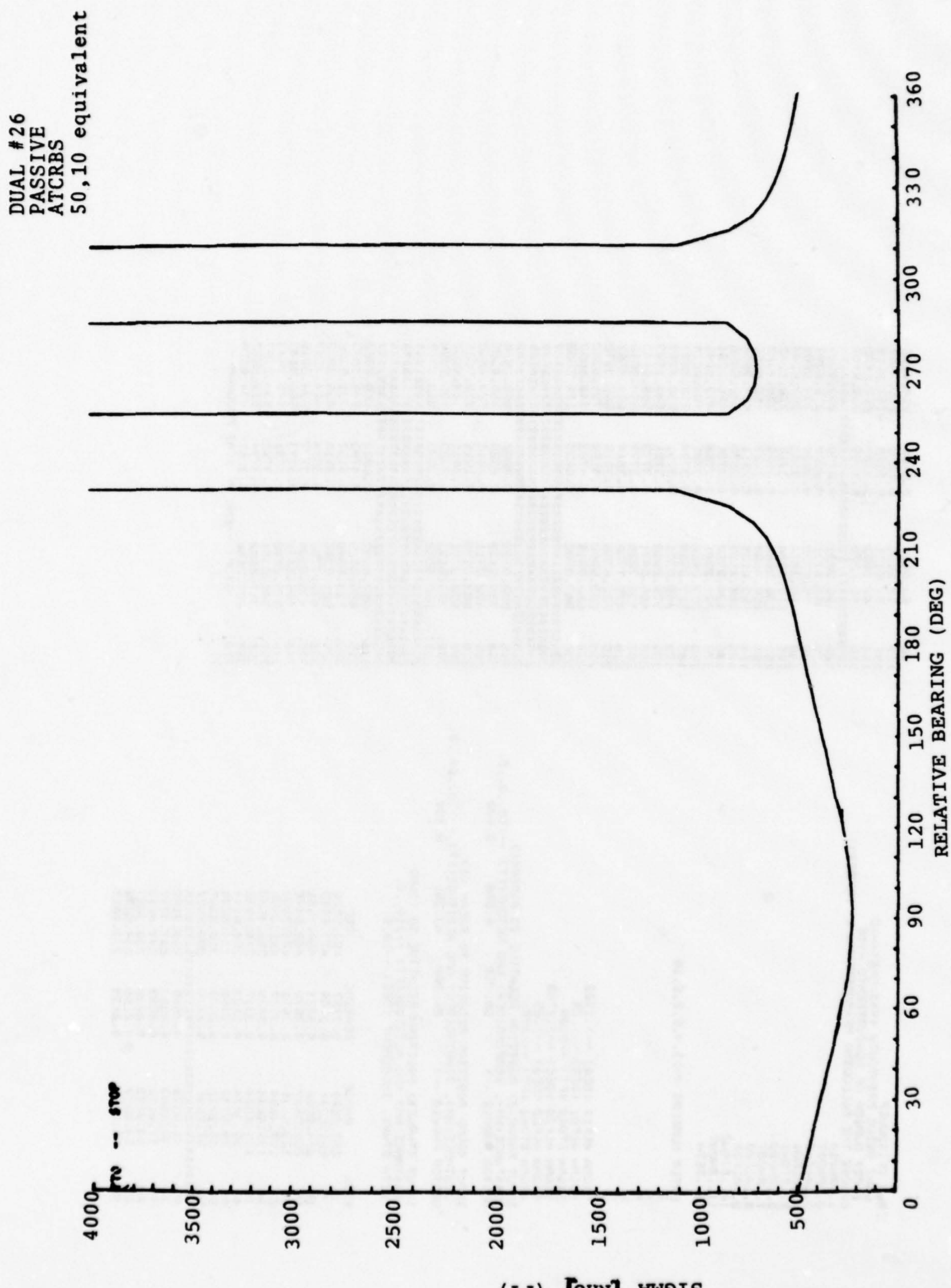
```
RUN D::DUALP
 WANT DEBUG PRINTOUTS (Y=1/N=2)-->2
 ENTER NUMBER OF MEASUREMENTS -->6
CHOOSE THE FOLLOWING MEASUREMENTS BY NUMBER!!
1..RHO10
2..RHO1T
3..ALF10
4..ALFD1
5..DTOA1
6..RHO20
7..RHO2T
8..ALF20
9..ALFD2
10..DTOA2
11..RHOOT
12..BETA

 ENTER NUMBERS -->1,3,5,6,8,10
 1
 3
 5
 6
 8
10
 SIGMA RHO10 (FT) -->100.
 SIGMA ALF10 (DEG) -->.1768
 SIGMA DTOA1 (FT) -->100.
 SIGMA RHO20 (FT) -->100.
 SIGMA ALF20 (DEG) -->.1768
 SIGMA DTOA2 (FT) -->100.
INPUT RADAR(2) POSITION RELATIVE TO RADAR(1)
 DISTANCE(NM), BEARING(DEG) AND HEIGHT(FT) -->100.,0.,0.
VECTOR RHOV12 -->      100.000     0.000     0.000

INPUT (OWN) POSITION RELATIVE TO RADAR (1)
 DISTANCE(NM), BEARING(DEG) AND ALTITUDE(FT) -->100.,60.,0.
VECTOR RHOV10 -->       50.000    86.603     0.000

INPUT (TARGET) POSITION RELATIVE TO (OWN)
 DISTANCE(NM) AND ALTITUDE(FT) -->20.,0.
 BETA START, INCREMENT (DEG) -->0,5

BETA      RANGE      BEARING      CEP
  0     402.1428     0.2945    742.8848
  5     362.9972     0.2932    720.0143
 10     324.3014     0.2902    695.8047
 15     286.3560     0.2857    670.2928
 20     249.4816     0.2797    643.5703
 25     214.0165     0.2722    615.7770
 30     180.3227     0.2634    587.0972
 35     148.8041     0.2534    557.7600
 40     119.9488     0.2425    528.0426
 45      94.4166     0.2307    498.2771
 50      73.2042     0.2183    468.8601
 55      57.8348     0.2058    440.2648
 60      50.0000     0.1933    413.0543
 65      49.6939     0.1814    387.8927
 70      54.1239     0.1704    365.5447
 75      59.9858     0.1611    346.8545
 80      65.1657     0.1538    332.6852
 85      68.5928     0.1492    323.8130
 90      62.7814     0.1476    320.7888
 95      68.5928     0.1492    323.8130
100      65.1657     0.1538    332.6852
105      59.9858     0.1611    346.8545
110      54.1239     0.1704    365.5447
115      49.6939     0.1814    387.8927
120      50.0000     0.1933    413.0543
125      57.8348     0.2058    440.2648
130      73.2042     0.2183    468.8601
135      94.4166     0.2307    498.2771
140     119.9488     0.2425    528.0426
145     148.8041     0.2534    557.7600
150     180.3227     0.2634    587.0972
155     214.0165     0.2722    615.7770
160     249.4816     0.2797    643.5703
165     286.3560     0.2857    670.2928
170     324.3014     0.2902    695.8047
175     362.9972     0.2932    720.0143
180     402.1428     0.2945    742.8848
185     441.4678     0.2942    764.4495
190     480.7506     0.2925    784.8349
195     519.8521     0.2894    804.3050
200     558.7769     0.2851    823.3422
205     597.7939     0.2801    842.8092
210     637.6971     0.2751    864.3031
215     680.4390     0.2712    891.0129
220     730.9093     0.2712    930.0976
225     802.9909     0.2815   1000.6278
230     947.0377     0.3229   1168.6705
235    1461.2395     0.5032   1809.4517
240**************************************
245    1529.1010     0.4316   1782.1726
250    1039.3418     0.2380   1155.4110
255     926.0049     0.1800   1001.6537
260     887.7690     0.1537    945.7265
265     873.4949     0.1408    923.1245
270     869.7437     0.1368    916.8610
275     873.4949     0.1408    923.1245
280     887.7690     0.1537    945.7265
285     926.0049     0.1800   1001.6537
290    1039.3418     0.2380   1155.4110
295    1529.1010     0.4316   1782.1726
300**************************************
305    1461.2395     0.5032   1809.4517
310     947.0377     0.3229   1168.6705
315     802.9909     0.2815   1000.6278
320     730.9093     0.2712    930.0976
325     680.4390     0.2712    891.0129
330     637.6971     0.2751    864.3031
335     597.7939     0.2801    842.8092
340     558.7769     0.2851    823.3422
345     519.8521     0.2894    804.3050
350     480.7506     0.2925    784.8349
355     441.4678     0.2942    764.4495
360     402.1428     0.2945    742.8848
TT0  --  STOP  --END OF BCAS PROGRAM--
>
```


DUAL #26
PASSIVE
ATCRBS
10,5 equivalent
FTO -- STOP
SIGMA [RHO] (FT)
4000
3500
3000
2500
2000
1500
1000
500
0
30
60
90
120
150
180
210
240
270
300
330
360
RELATIVE BEARING (DEG)

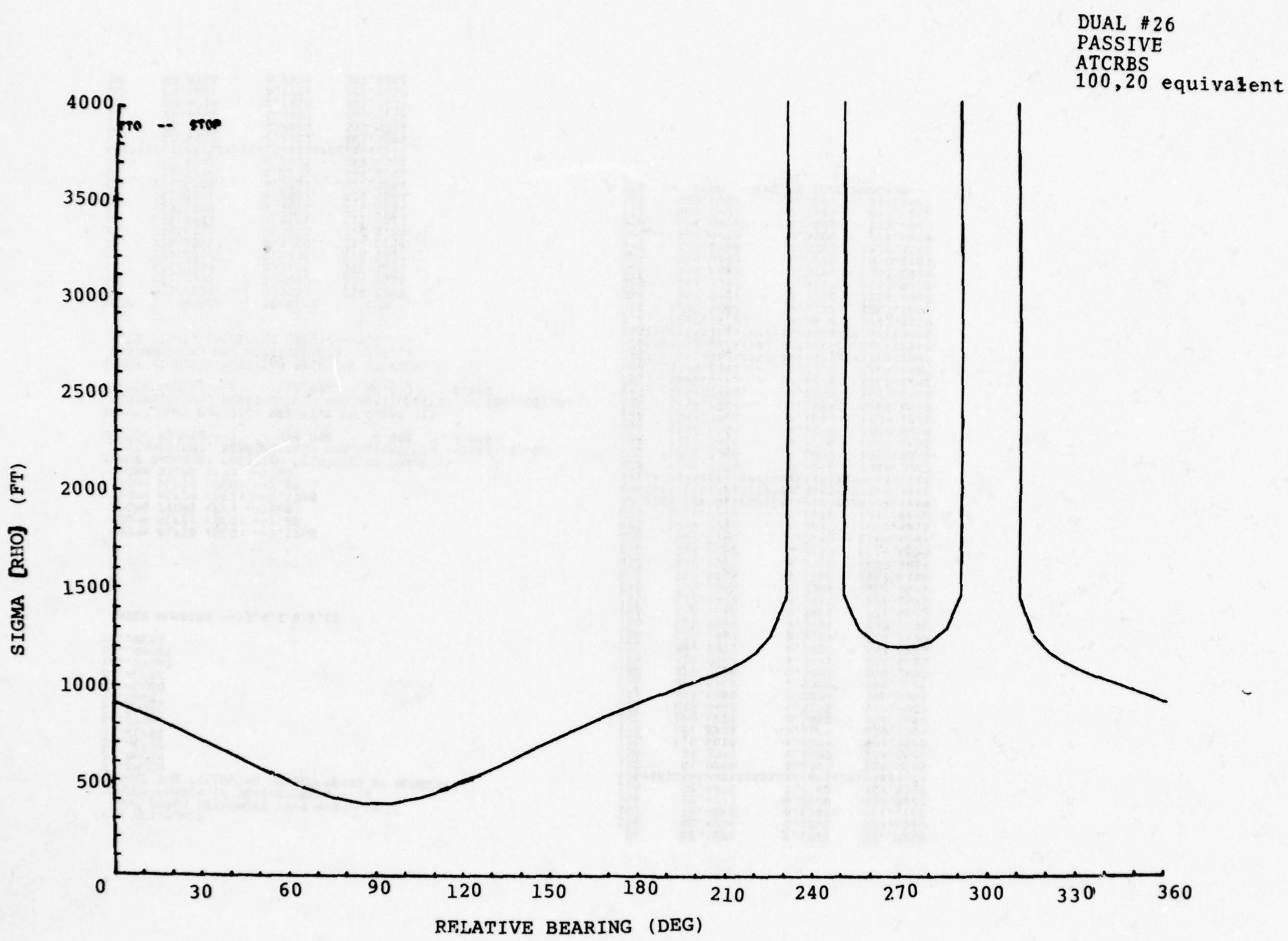
```
RUN DYIIDUALP
WANT DEBUG PRINTOUTS (Y=1 N=2)-->2
ENTER NUMBER OF MEASUREMENTS -->6
CHOOSE THE FOLLOWING MEASUREMENTS BY NUMBER!!
1..RHO10
2..RHO1T
3..ALF10
4..ALFD1
5..DTOA1
6..RHO20
7..RHO2T
8..ALF20
9..ALFD2
10..DTOA2
11..RHOOT
12..BETA

 ENTER NUMBERS -->3,4,5,8,9,10
 3
 4
 5
 8
 9
 10
 SIGMA ALF10 (DEG) -->.1768
 SIGMA ALFD1 (DEG) -->.25
 SIGMA DTOA1 (FT) -->100.
 SIGMA ALF20 (DEG) -->.1768
 SIGMA ALFD2 (DEG) -->.25
 SIGMA DTOA2 (FT) -->100.
INPUT RADAR(2) POSITION RELATIVE TO RADAR(1)
 DISTANCE(NM), BEARING(DEG) AND HEIGHT(FT) -->10.,0.,0.
VECTOR RHOV12 -->        10.000      0.000      0.000

INPUT (OWN) POSITION RELATIVE TO RADAR (1)
 DISTANCE(NM), BEARING(DEG) AND ALTITUDE(FT) -->10.,60.,0.
VECTOR RHOV10 -->         5.000      8.660      0.000

INPUT (TARGET) POSITION RELATIVE TO (OWN)
 DISTANCE(NM) AND ALTITUDE(FT) -->5.,0.
 BETA START, INCREMENT (DEG) -->0,5

BETA      RANGE       BEARING      CEP
 0     168.3572       0.4690    300.3019
 5     154.7596       0.4677    292.3030
 10    141.5744       0.4653    284.4351
 15    128.8417       0.4616    276.6060
 20    116.6321       0.4567    268.7761
 25    105.0363       0.4505    260.9438
 30     94.1583       0.4431    253.1364
 35     84.1110       0.4348    245.4041
 40     75.0107       0.4256    237.8156
 45     66.9703       0.4159    230.4553
 50     60.0277       0.4058    223.4205
 55     54.4278       0.3958    216.8186
60****************************************
 65     46.7388       0.3772    205.3760
 70     44.4999       0.3692    200.7698
 75     43.0814       0.3626    197.0547
 80     42.2648       0.3577    194.3258
 85     41.8600       0.3547    192.6569
 90     41.7398       0.3538    192.0952
 95     41.8600       0.3547    192.6569
100     42.2648       0.3577    194.3258
105     43.0814       0.3626    197.0547
110     44.4999       0.3692    200.7698
115     46.7388       0.3772    205.3760
120****************************************
125     54.4278       0.3958    216.8186
130     60.0277       0.4058    223.4205
135     66.9703       0.4159    230.4553
140     75.0107       0.4256    237.8156
145     84.1110       0.4348    245.4041
150     94.1583       0.4431    253.1364
155    105.0363       0.4505    260.9438
160    116.6321       0.4567    268.7761
165    128.8417       0.4616    276.6060
170    141.5744       0.4653    284.4351
175    154.7596       0.4677    292.3030
180    168.3572       0.4690    300.3019
185    182.3741       0.4695    308.5990
190    196.8923       0.4697    317.4748
195    212.1178       0.4703    327.3871
200    228.4694       0.4725    339.0878
205    246.7499       0.4783    353.8444
210    268.5018       0.4907    373.8933
215    296.8144       0.5154    403.4563
220    338.3880       0.5632    451.3100
225    409.8015       0.6589    538.5302
230    562.5743       0.8756    729.4245
235   1057.5911       1.5744   1347.3652
240****************************************
245   1093.4414       1.3428   1304.8125
250    603.4727       0.6369    691.5372
255    458.9236       0.4108    507.9952
260    399.0228       0.3069    430.9300
265    372.8773       0.2569    396.9777
270    365.3728       0.2416    387.1862
275    372.8773       0.2569    396.9777
280    399.0228       0.3069    430.9300
285    458.9236       0.4108    507.9952
290    603.4727       0.6369    691.5372
295   1093.4414       1.3428   1304.8125
300****************************************
305   1057.5911       1.5744   1347.3652
310    562.5743       0.8756    729.4245
315    409.8015       0.6589    538.5302
320    338.3880       0.5632    451.3100
325    296.8144       0.5154    403.4563
330    268.5018       0.4907    373.8933
335    246.7499       0.4783    353.3444
340    228.4694       0.4725    339.0878
345    212.1178       0.4703    327.3871
350    196.8923       0.4697    317.4748
355    182.3741       0.4695    308.5990
360    168.3572       0.4690    300.3019
TT0  --  STOP  --END OF BCAS PROGRAM--
>
```


DUAL #26
ATCRBS
20,8 equivalent
FTG -- STOP
SIGMA [RHO] (FT)
4000
3500
3000
2500
2000
1500
1000
500
0
30
60
90
120
150
180
210
240
270
300
330
360
RELATIVE BEARING (DEG)

```
RUN DCIIRUALP
 WANT DEBUG PRINTOUTS (Y=1,N=2)-->2
 ENTER NUMBER OF MEASUREMENTS -->6
CHOOSE THE FOLLOWING MEASUREMENTS BY NUMBER::
1..RHO10
2..RHO1T
3..ALF10
4..ALFD1
5..DTOA1
6..RHO20
7..RHO2T
8..ALF20
9..ALFD2
10..DTOA2
11..RHO0T
12..BETA

 ENTER NUMBERS -->3,4,5,8,9,10
 3
 4
 5
 8
 9
10
 SIGMA ALF10 (DEG) -->.1768
 SIGMA ALFD1 (DEG) -->.25
 SIGMA DTOA1 (FT) -->100.
 SIGMA ALF20 (DEG) -->.1768
 SIGMA ALFD2 (DEG) -->.25
 SIGMA DTOA2 (FT) -->100.
INPUT RADAR(2) POSITION RELATIVE TO RADAR(1)
 DISTANCE(NM), BEARING(DEG) AND HEIGHT(FT) -->20.,0.,0.
VECTOR RHOV12 -->       20.000     0.000      0.000

INPUT (OWN) POSITION RELATIVE TO RADAR (1)
 DISTANCE(NM), BEARING(DEG) AND ALTITUDE(FT) -->20.,60.,0.
VECTOR RHOV10 -->       10.000    17.321      0.000

INPUT (TARGET) POSITION RELATIVE TO (OWN)
 DISTANCE(NM) AND ALTITUDE(FT) -->8.,0.
 BETA START, INCREMENT (DEG) -->0,5

BETA      RANGE      BEARING      CEP
  0     230.2140     0.3976    408.4064
  5     209.7312     0.3966    396.4882
 10     189.6126     0.3940    384.3159
 15     169.9790     0.3898    371.8199
 20     150.9866     0.3839    358.9889
 25     132.8201     0.3764    345.8558
 30     115.6899     0.3674    332.4900
 35      99.8355     0.3571    318.9925
 40      85.5310     0.3457    305.4944
 45      73.0883     0.3334    292.1554
 50      62.8446     0.3206    279.1641
 55      55.1030     0.3076    266.7383
 60*************************************
 65      47.3425     0.2828    244.5894
 70      46.5698     0.2720    235.4211
 75      46.9252     0.2629    227.9057
 80      47.6977     0.2559    222.3099
 85      48.3639     0.2516    218.8543
 90      48.6188     0.2501    217.6852
 95      48.3639     0.2516    218.8543
100      47.6977     0.2559    222.3099
105      46.9252     0.2629    227.9057
110      46.5698     0.2720    235.4211
115      47.3425     0.2828    244.5894
120*************************************
125      55.1030     0.3076    266.7383
130      62.8446     0.3206    279.1641
135      73.0883     0.3334    292.1554
140      85.5310     0.3457    305.4944
145      99.8355     0.3571    318.9925
150     115.6899     0.3674    332.4900
155     132.8201     0.3764    345.8558
160     150.9866     0.3839    358.9889
165     169.9790     0.3898    371.8199
170     189.6126     0.3940    384.3159
175     209.7312     0.3966    396.4882
180     230.2140     0.3976    408.4064
185     250.9918     0.3973    420.2199
190     272.0744     0.3958    432.1963
195     293.6007     0.3938    444.7866
200     315.9302     0.3921    458.7461
205     339.8225     0.3918    475.3669
210     366.8153     0.3952    496.9669
215     400.1052     0.4061    528.0080
220     446.8628     0.4321    577.9936
225     525.4551     0.4907    670.3664
230     694.8787     0.6334    878.4072
235    1260.4112     1.1147   1575.7597
240*************************************
245    1311.5257     0.9538   1541.0650
250     754.0734     0.4637    850.5181
255     597.0211     0.3092    652.1072
260     534.6237     0.2392    571.8336
265     508.2016     0.2058    537.3650
270     500.7358     0.1957    527.5502
275     508.2016     0.2058    537.3650
280     534.6237     0.2392    571.8336
285     597.0211     0.3092    652.1072
290     754.0734     0.4637    850.5181
295    1311.5257     0.9538   1541.0650
300*************************************
305    1260.4112     1.1147   1575.7597
310     694.8787     0.6334    878.4072
315     525.4551     0.4907    670.3664
320     446.8628     0.4321    577.9936
325     400.1052     0.4061    528.0080
330     366.8153     0.3952    496.9669
335     339.8225     0.3918    475.3669
340     315.9302     0.3921    458.7461
345     293.6007     0.3938    444.7866
350     272.0744     0.3958    432.1963
355     250.9918     0.3973    420.2199
360     230.2140     0.3976    408.4064
TT0  --  STOP  --END OF DCMS PROGRAM--
>
```

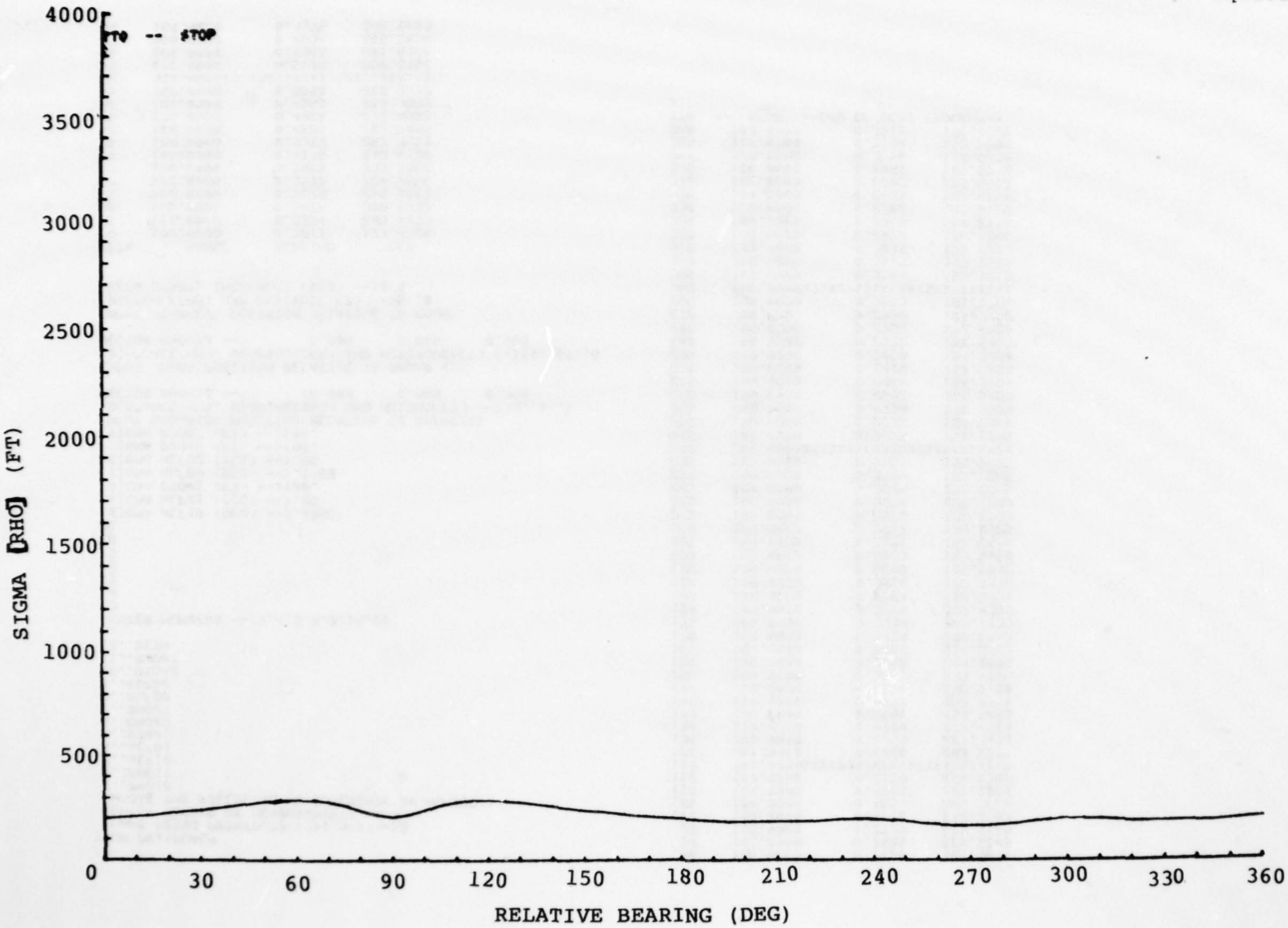

DUAL #26
PASSIVE
ATCRBS
50,10 equivalent
SIGMA [RHO] (FT)
4000
3500
3000
2500
2000
1500
1000
500
0
30
60
90
120
150
180
210
240
270
300
330
360
RELATIVE BEARING (DEG)

```
:RUN DY1:DUALP
  WAIT DEBUG PRINTOUTS (Y=1/N=2)-->2
  ENTER NUMBER OF MEASUREMENTS -->6
 CHOOSE THE FOLLOWING MEASUREMENTS BY NUMBER!!
 1..RHO10
 2..RHO1T
 3..ALF10
 4..ALFD1
 5..DTOA1
 6..RHO20
 7..RHO2T
 8..ALF20
 9..ALFD2
 10..DTOA2
 11..RHOOT
 12..BETA

  ENTER NUMBERS -->3,4,5,8,9,10
  3
  4
  5
  8
  9
 10
  SIGMA ALF10 (DEG) -->.1768
  SIGMA ALFD1 (DEG) -->.25
  SIGMA DTOA1 (FT) -->100.
  SIGMA ALF20 (DEG) -->.1768
  SIGMA ALFD2 (DEG) -->.25
  SIGMA DTOA2 (FT) -->100.
 INPUT RADAR(2) POSITION RELATIVE TO RADAR(1)
  DISTANCE(NM), BEARING(DEG) AND HEIGHT(FT) -->50.,0.,0.
 VECTOR RHOV12 -->        50.000      0.000      0.000

 INPUT <OWN> POSITION RELATIVE TO RADAR (1)
  DISTANCE(NM), BEARING(DEG) AND ALTITUDE(FT) -->50.,60.,0.
 VECTOR RHOV10 -->        25.000     43.301      0.000

 INPUT <TARGET> POSITION RELATIVE TO <OWN>
  DISTANCE(NM) AND ALTITUDE(FT) -->10.,0.
  BETA START, INCREMENT (DEG) -->0,5

 BETA      RANGE        BEARING       CEP
  0      289.2680      0.3787      494.9270
  5      261.8221      0.3766      477.5845
 10      234.9762      0.3731      460.1581
 15      208.8507      0.3679      442.5442
 20      183.6131      0.3611      424.7052
 25      159.4694      0.3527      406.6556
 30      136.6644      0.3429      388.4529
 35      115.4904      0.3317      370.1942
 40       96.3074      0.3193      352.0144
 45       79.5739      0.3060      334.0880
 50       65.2731      0.2920      316.6307
 55       55.2631      0.2778      299.9029
 60****************************************
 65       48.0379      0.2505      269.9100
 70       48.2603      0.2383      257.3892
 75       51.0111      0.2280      247.0613
 80       53.2286      0.2200      239.3267
 85       54.9227      0.2150      234.5285
 90       55.5088      0.2133      232.9013
 95       54.9227      0.2150      234.5285
100       53.2286      0.2200      239.3267
105       51.0111      0.2280      247.0613
110       48.2603      0.2383      257.3892
115       48.0379      0.2505      269.9100
120****************************************
125       55.8631      0.2778      299.9029
130       65.8731      0.2920      316.6307
135       79.5739      0.3060      334.0880
140       96.3074      0.3193      352.0144
145      115.4904      0.3317      370.1942
150      136.6644      0.3429      388.4529
155      159.4694      0.3527      406.6556
160      183.6131      0.3611      424.7052
165      208.8507      0.3679      442.5442
170      234.9762      0.3731      460.1581
175      261.8221      0.3766      477.5845
180      289.2680      0.3787      494.9270
185      317.2588      0.3794      512.3807
190      345.8381      0.3791      530.2757
195      375.2092      0.3781      549.1543
200      405.8471      0.3773      569.9143
205      438.7220      0.3777      594.0916
210      475.7752      0.3814      624.4567
215      521.0366      0.3918      666.3972
220      583.5909      0.4159      731.5302
225      686.9015      0.4703      848.8863
230      907.0502      0.6038     1110.2862
235****************************************
240****************************************
245****************************************
250****************************************
255      802.9202      0.2992      863.3510
260      724.9133      0.2329      765.8399
265      692.3711      0.2011      724.4862
270      683.2575      0.1915      712.7921
275      692.3711      0.2011      724.4862
280      724.9133      0.2329      765.8399
285      802.9202      0.2992      863.3519
290****************************************
295****************************************
300****************************************
305****************************************
310      907.0502      0.6038     1110.2862
315      686.9015      0.4703      848.8863
320      583.5909      0.4159      731.5302
325      521.0366      0.3918      666.3972
330      475.7752      0.3814      624.4567
335      438.7220      0.3777      594.0916
340      405.8471      0.3773      569.9143
345      375.2092      0.3781      549.1543
350      345.8381      0.3791      530.2757
355      317.2588      0.3794      512.3807
360      289.2680      0.3787      494.9270
TT0  --  STOP  --END OF BCAS PROGRAM--
>
```

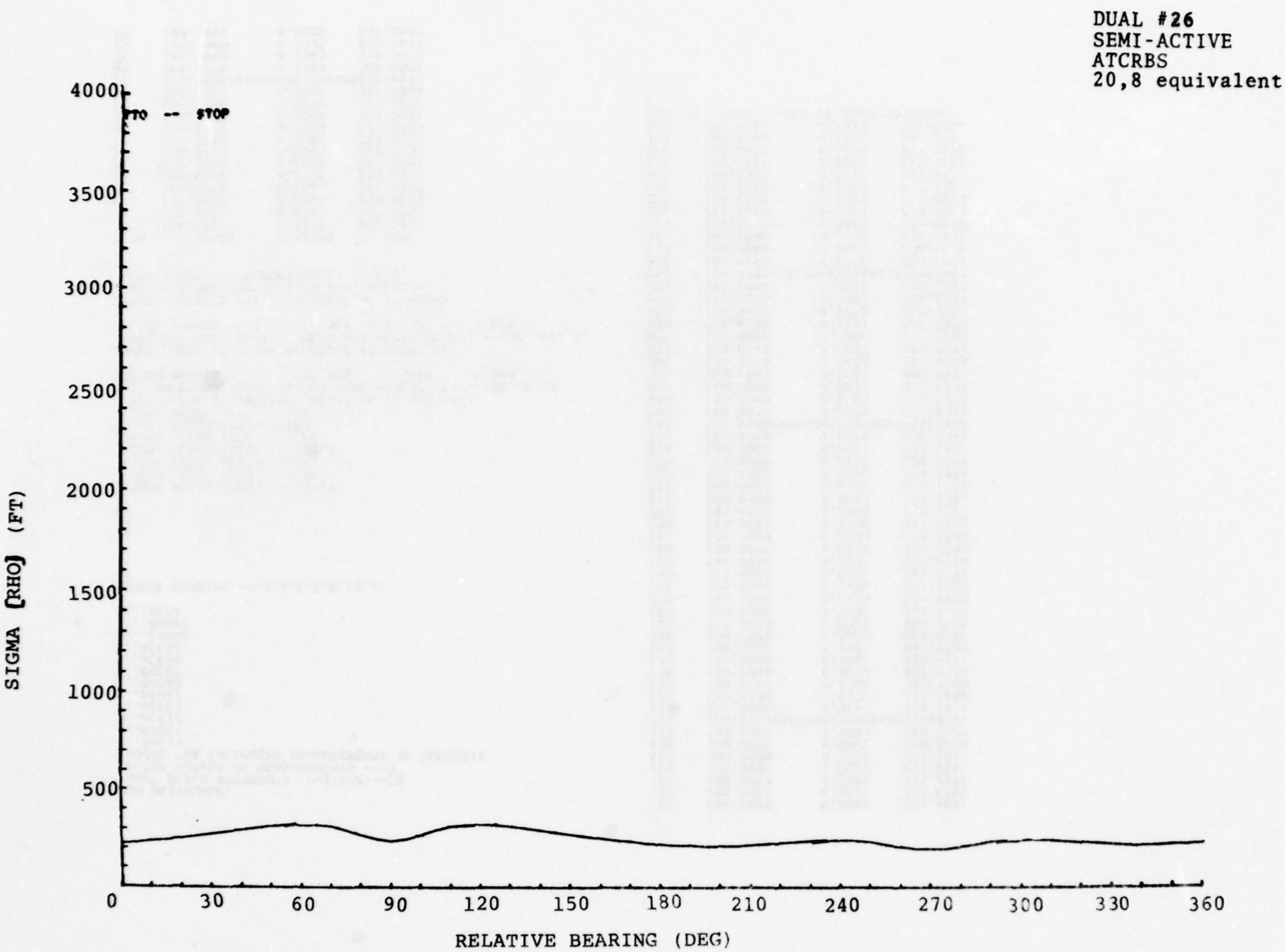

DUAL #26
PASSIVE
ATCRBS
100,20 equivalent
SIGMA [RHO] (FT)
4000
3500
3000
2500
2000
1500
1000
500
0
30
60
90
120
150
180
210
240
270
300
330
360
RELATIVE BEARING (DEG)
TO -- STOP

```
>RUN DK1:DUALP
 WANT DEBUG PRINTOUTS (Y=1/N=2)-->2
 ENTER NUMBER OF MEASUREMENTS -->6
CHOOSE THE FOLLOWING MEASUREMENTS BY NUMBER::
1..RHO10
2..RHO1T
3..ALF10
4..ALFD1
5..DTOA1
6..RHO20
7..RHO2T
8..ALF20
9..ALFD2
10..DTOA2
11..RHO0T
12..BETA

 ENTER NUMBERS -->3,4,5,8,9,10
 3
 4
 5
 8
 9
10
 SIGMA ALF10 (DEG) -->.1768
 SIGMA ALFD1 (DEG) -->.25
 SIGMA DTOA1 (FT) -->100.
 SIGMA ALF20 (DEG) -->.1768
 SIGMA ALFD2 (DEG) -->.25
 SIGMA DTOA2 (FT) -->100.
INPUT RADAR<2> POSITION RELATIVE TO RADAR<1>
 DISTANCE(NM), BEARING(DEG) AND HEIGHT(FT) -->100.,0.,0.
VECTOR RHOV12 -->      100.000     0.000     0.000

INPUT <OWN> POSITION RELATIVE TO RADAR <1>
 DISTANCE(NM), BEARING(DEG) AND ALTITUDE(FT) -->100.,60.,0.
VECTOR RHOV10 -->       50.000    86.603     0.000

INPUT <TARGET> POSITION RELATIVE TO <OWN>
 DISTANCE(NM) AND ALTITUDE(FT) -->20.,0.
 BETA START, INCREMENT (DEG) -->0,5

BETA       RANGE        BEARING       CEP
  0      533.1994       0.3504     914.6407
  5      481.3977       0.3497     884.2696
 10      429.9444       0.3471     852.5483
 15      379.2209       0.3425     819.5007
 20      329.6368       0.3360     785.2101
 25      281.6250       0.3276     749.8126
 30      235.6448       0.3175     713.4963
 35      192.1925       0.3058     676.5034
 40      151.8830       0.2927     639.1364
 45      115.5000       0.2784     601.7680
 50       84.3770       0.2633     564.8545
 55       61.0980       0.2477     528.9535
60***************************************
 65       52.5472       0.2169     463.0399
 70       62.4974       0.2029     434.8038
 75       73.4659       0.1907     411.1158
 80       22.4234       0.1812     393.1027
 85       22.1281       0.1751     381.7958
 90       90.0759       0.1731     377.9362
 95       88.1281       0.1751     381.7958
100       82.4234       0.1812     393.1027
105       73.4659       0.1907     411.1158
110       62.4974       0.2029     434.8038
115       52.5472       0.2169     463.0399
120***************************************
125       61.0980       0.2477     528.9535
130       84.3770       0.2633     564.8545
135      115.5000       0.2784     601.7680
140      151.8830       0.2927     639.1364
145      192.1995       0.3058     676.5034
150      235.6448       0.3175     713.4963
155      281.6250       0.3276     749.8126
160      329.6368       0.3360     785.2101
165      379.2209       0.3425     819.5007
170      429.9444       0.3471     852.5483
175      481.3977       0.3497     884.2696
180      533.1994       0.3504     914.6407
185      585.0094       0.3491     943.7100
190      636.5505       0.3461     971.6223
195      687.6472       0.3415     998.6648
200      738.2958       0.3355    1025.3549
205      788.8033       0.3286    1052.6184
210      840.0907       0.3216    1082.1854
215      894.4362       0.3159    1117.5538
220      957.5765       0.3142    1166.6907
225     1045.9264       0.3237    1251.1511
230     1219.7579       0.3670    1447.0170
235***************************************
240***************************************
245***************************************
250     1342.2789       0.2712    1460.3407
255     1208.9386       0.2079    1286.8242
260     1164.9468       0.1790    1225.2456
265     1148.8704       0.1648    1200.8630
270     1144.7065       0.1604    1194.1876
275     1148.8704       0.1648    1200.8630
280     1164.9468       0.1790    1225.2456
285     1208.9386       0.2079    1286.8242
290     1342.2789       0.2712    1460.3407
295***************************************
300***************************************
305***************************************
310     1219.7579       0.3670    1447.0170
315     1045.9264       0.3237    1251.1511
320      957.5765       0.3142    1166.6907
325      894.4362       0.3159    1117.5538
330      840.0907       0.3216    1082.1854
335      788.8033       0.3286    1052.6184
340      738.2958       0.3355    1025.3549
345      687.6472       0.3415     998.6648
350      636.5505       0.3461     971.6223
355      585.0094       0.3491     943.7100
360      533.1994       0.3504     914.6407
TT0  --  STOP  --END OF BCAS PROGRAM--
>
```

DUAL #26
SEMI-ACTIVE
ATCRBS
10,5 equivalent

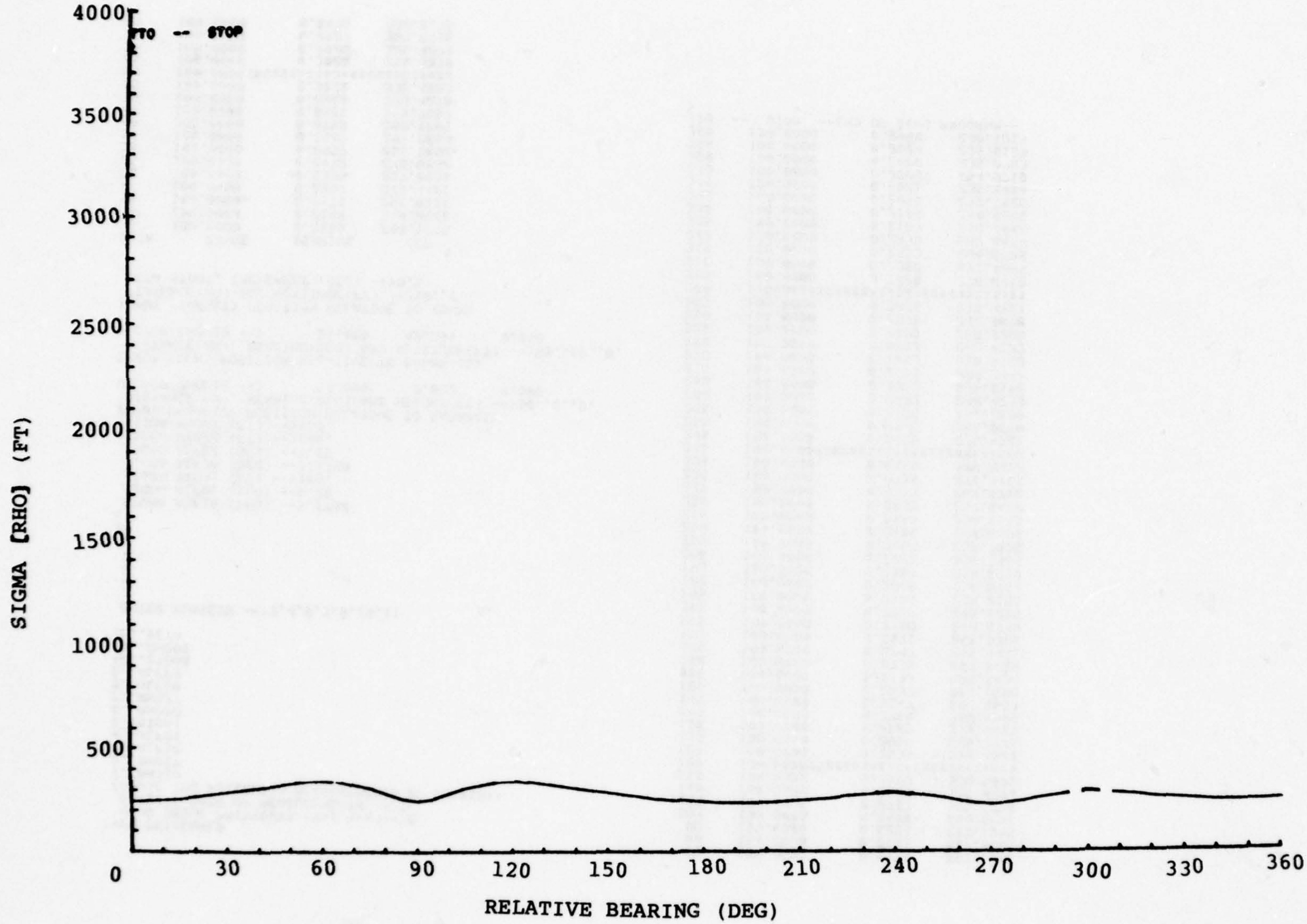


```
>RUN DK1:DUALP
 WANT DEBUG PRINTOUTS (Y=1/N=2)-->2
 ENTER NUMBER OF MEASUREMENTS -->7
CHOOSE THE FOLLOWING MEASUREMENTS BY NUMBER::
1..RHO10
2..RHO1T
3..ALF10
4..ALFD1
5..DTOA1
6..RHO20
7..RHO2T
8..ALF20
9..ALFD2
10..DTOA2
11..RHOOT
12..BETA

 ENTER NUMBERS -->3,4,5,8,9,10,11
 3
 4
 5
 8
 9
 10
 11
 SIGMA ALF10 (DEG) -->.1768
 SIGMA ALFD1 (DEG) -->.25
 SIGMA DTOA1 (FT) -->100.
 SIGMA ALF20 (DEG) -->.1768
 SIGMA ALFD2 (DEG) -->.25
 SIGMA DTOA2 (FT) -->100.
 SIGMA RHOOT (FT) -->100.
INPUT RADAR(2) POSITION RELATIVE TO RADAR(1)
 DISTANCE(NM), BEARING(DEG) AND HEIGHT(FT) -->10.,0.,0.
VECTOR RHO012 -->      10.000      0.000      0.000

INPUT (OWN) POSITION RELATIVE TO RADAR (1)
 DISTANCE(NM), BEARING(DEG) AND ALTITUDE(FT) -->10.,60.,0.
VECTOR RHO010 -->       5.000      8.660      0.000

INPUT (TARGET) POSITION RELATIVE TO (OWN)
 DISTANCE(NM) AND ALTITUDE(FT) -->5.,0.
 BETA START, INCREMENT (DEG) -->0,5

BETA       RANGE        BEARING      CEP
  0     100.0000        0.3211     197.4395
  5     100.0000        0.3334     203.1133
 10     100.0000        0.3474     209.5932
 15     100.0000        0.3629     216.8553
 20     100.0000        0.3798     224.8695
 25     100.0000        0.3981     233.5866
 30     100.0000        0.4175     242.9188
 35     100.0000        0.4377     252.7110
 40     100.0000        0.4581     262.7003
 45     100.0000        0.4780     272.4563
 50     100.0000        0.4952     281.3033
 55     100.0000        0.5098     288.2277
 60     100.0000**************************
 65     100.0000        0.5139     290.2366
 70     100.0000        0.4966     281.6864
 75     100.0000        0.4634     265.2614
 80     100.0000        0.4175     242.9103
 85     100.0000        0.3730     221.8484
 90     100.0000        0.3538     212.5049
 95     100.0000        0.3730     221.6424
100     100.0000        0.4175     242.9103
105     100.0000        0.4634     265.2614
110     100.0000        0.4966     281.6864
115     100.0000        0.5139     290.2366
120     100.0000**************************
125     100.0000        0.5098     288.2277
130     100.0000        0.4959     281.3033
135     100.0000        0.4780     272.4563
140     100.0000        0.4581     262.7003
145     100.0000        0.4377     252.7110
150     100.0000        0.4175     242.9188
155     100.0000        0.3981     233.5866
160     100.0000        0.3798     224.8695
165     100.0000        0.3629     216.8553
170     100.0000        0.3474     209.5932
175     100.0000        0.3334     203.1133
180     100.0000        0.3211     197.4395
185     100.0000        0.3104     192.5998
190     100.0000        0.3016     188.6332
195     100.0000        0.2949     185.5942
200     100.0000        0.2903     183.5552
205     100.0000        0.2881     182.6014
210     100.0000        0.2886     182.8125
215     100.0000        0.2918     184.2194
220     100.0000        0.2974     186.7206
225     100.0000        0.3046     189.9529
230     100.0000        0.3117     193.1588
235     100.0000        0.3161     195.1805
240     100.0000**************************
245     100.0000        0.3073     191.1706
250     100.0000        0.2930     184.7492
255     100.0000        0.2752     176.9080
260     100.0000        0.2582     169.5463
265     100.0000        0.2460     164.3794
270     100.0000        0.2416     162.5294
275     100.0000        0.2460     164.3794
280     100.0000        0.2582     169.5463
285     100.0000        0.2752     176.9080
290     100.0000        0.2930     184.7492
295     100.0000        0.3073     191.1706
300     100.0000**************************
305     100.0000        0.3161     195.1805
310     100.0000        0.3117     193.1588
315     100.0000        0.3046     189.9529
320     100.0000        0.2974     186.7206
325     100.0000        0.2918     184.2194
330     100.0000        0.2886     182.8125
335     100.0000        0.2881     182.6014
340     100.0000        0.2903     183.5552
345     100.0000        0.2949     185.5942
350     100.0000        0.3016     188.6332
355     100.0000        0.3104     192.5998
360     100.0000        0.3211     197.4395
TT0 --  STOP  --END OF BCAS PROGRAM--
>
```


DUAL #26
SEMI-ACTIVE
ATCRBS
20,8 equivalent
FTO -- STOP
SIGMA [RHO] (FT)
4000
3500
3000
2500
2000
1500
1000
500
0
30
60
90
120
150
180
210
240
270
300
330
360
RELATIVE BEARING (DEG)

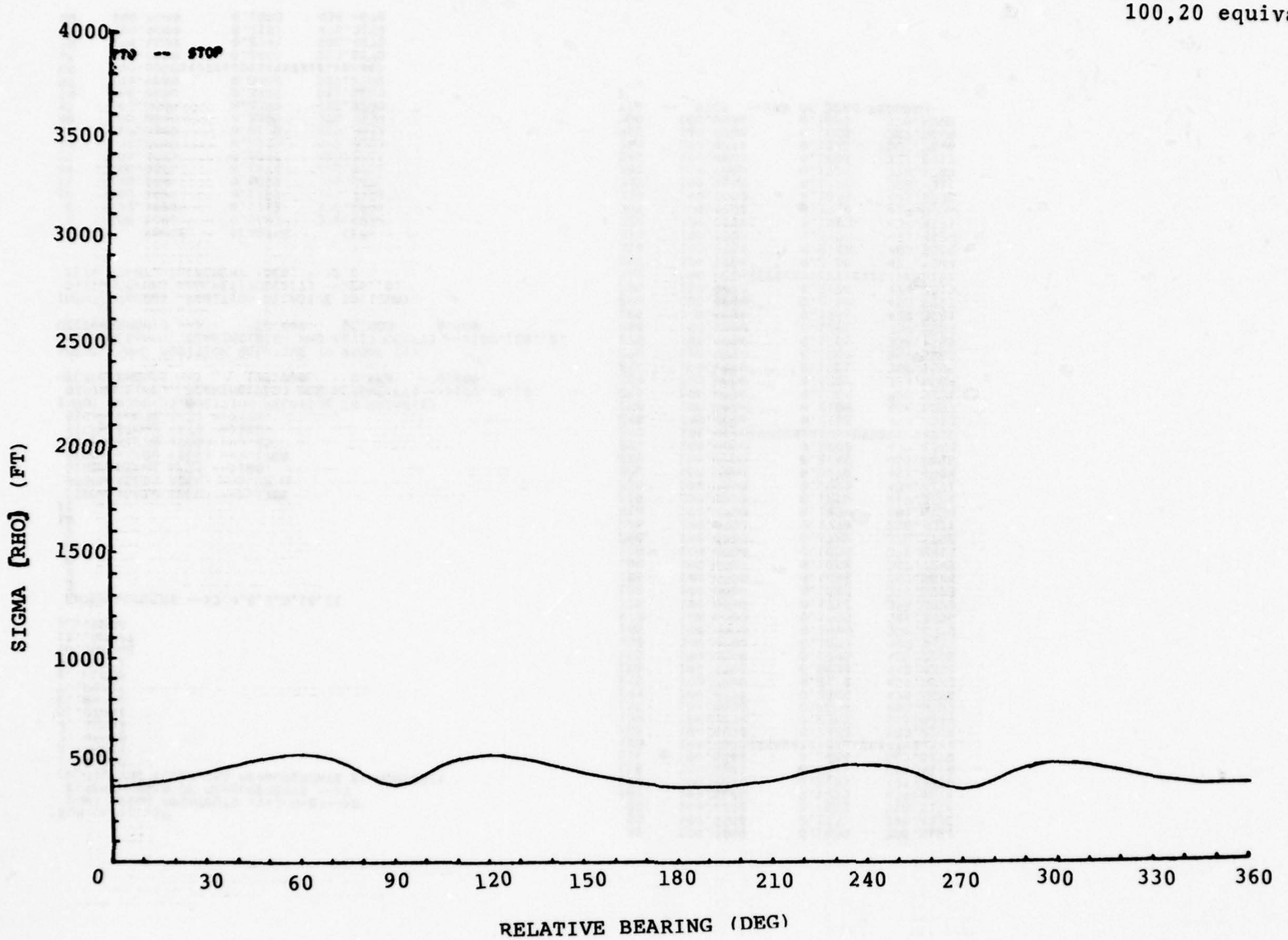
```
:RUN DK1:RUNLP
 WANT DEBUG PRINTOUTS (Y=1/N=2)-->2
 ENTER NUMBER OF MEASUREMENTS -->7
CHOOSE THE FOLLOWING MEASUREMENTS BY NUMBER::
1..RHO12
2..RHO1T
3..ALF10
4..ALFD1
5..DTOA1
6..RHO20
7..RHO2T
8..ALF20
9..ALFD2
10..DTOA2
11..RHO0T
12..BETA

 ENTER NUMBERS -->3,4,5,8,9,10,11
 3
 4
 5
 8
 9
 10
 11
 SIGMA ALF10 (DEG) -->.1768
 SIGMA ALFD1 (DEG) -->.25
 SIGMA DTOA1 (FT) -->100.
 SIGMA ALF20 (DEG) -->.1768
 SIGMA ALFD2 (DEG) -->.25
 SIGMA DTOA2 (FT) -->100.
 SIGMA RHO0T (FT) -->100.
INPUT RADAR(2) POSITION RELATIVE TO RADAR(1)
 DISTANCE(NM), BEARING(DEG) AND HEIGHT(FT) -->20.,0.,0.
VECTOR RHOV12 -->        20.000      0.000      0.000

INPUT (OWN) POSITION RELATIVE TO RADAR (1)
 DISTANCE(NM), BEARING(DEG) AND ALTITUDE(FT) -->20.,60.,0.
VECTOR RHOV10 -->        10.000     17.321      0.000

INPUT (TARGET) POSITION RELATIVE TO (OWN)
 DISTANCE(NM) AND ALTITUDE(FT) -->8.,0.
 BETA START, INCREMENT (DEG) -->0,5

BETA      RANGE       BEARING        CEP
  0     100.0000      0.2334     221.8036
  5     100.0000      0.2408     227.4263
 10     100.0000      0.2495     234.0923
 15     100.0000      0.2594     241.7377
 20     100.0000      0.2705     250.2976
 25     100.0000      0.2825     259.6900
 30     100.0000      0.2954     269.7936
 35     100.0000      0.3088     280.4151
 40     100.0000      0.3224     291.2438
 45     100.0000      0.3356     301.7860
 50     100.0000      0.3475     311.2806
 55     100.0000      0.3566     318.6014
 60     100.0000*****************************
 65     100.0000      0.3584     320.0828
 70     100.0000      0.3463     310.3472
 75     100.0000      0.3235     292.1044
 80     100.0000      0.2926     267.5907
 85     100.0000      0.2629     244.4601
 90     100.0000      0.2501     234.5700
 95     100.0000      0.2629     244.4601
100     100.0000      0.2926     267.5907
105     100.0000      0.3235     292.1044
110     100.0000      0.3463     310.3472
115     100.0000      0.3584     320.0828
120     100.0000*****************************
125     100.0000      0.3566     318.6014
130     100.0000      0.3475     311.2806
135     100.0000      0.3356     301.7860
140     100.0000      0.3224     291.2438
145     100.0000      0.3088     280.4151
150     100.0000      0.2954     269.7935
155     100.0000      0.2825     259.6900
160     100.0000      0.2705     250.2976
165     100.0000      0.2594     241.7377
170     100.0000      0.2495     234.0923
175     100.0000      0.2408     227.4263
180     100.0000      0.2334     221.8036
185     100.0000      0.2274     217.2974
190     100.0000      0.2230     213.9972
195     100.0000      0.2204     212.0103
200     100.0000      0.2196     211.4546
205     100.0000      0.2209     212.4387
210     100.0000      0.2244     215.0209
215     100.0000      0.2298     219.1388
220     100.0000      0.2369     224.5082
225     100.0000      0.2448     230.5077
230     100.0000      0.2521     236.1026
235     100.0000      0.2570     239.8981
240     100.0000*****************************
245     100.0000      0.2528     236.6410
250     100.0000      0.2422     228.5312
255     100.0000      0.2276     217.4263
260     100.0000      0.2121     205.8973
265     100.0000      0.2002     197.1255
270     100.0000      0.1957     193.8373
275     100.0000      0.2002     197.1255
280     100.0000      0.2121     205.8973
285     100.0000      0.2276     217.4263
290     100.0000      0.2422     228.5312
295     100.0000      0.2528     236.6410
300     100.0000*****************************
305     100.0000      0.2570     239.6981
310     100.0000      0.2521     236.1025
315     100.0000      0.2448     230.5077
320     100.0000      0.2369     224.5082
325     100.0000      0.2298     219.1388
330     100.0000      0.2244     215.0209
335     100.0000      0.2209     212.4387
340     100.0000      0.2196     211.4546
345     100.0000      0.2204     212.0103
350     100.0000      0.2230     213.9972
355     100.0000      0.2274     217.2974
360     100.0000      0.2334     221.8036
TT0 --  STOP  --END OF BCHS PROGRAM--
>
```

DUAL #26
SEMI-ACTIVE
ATCRBS
50,10 equivalent

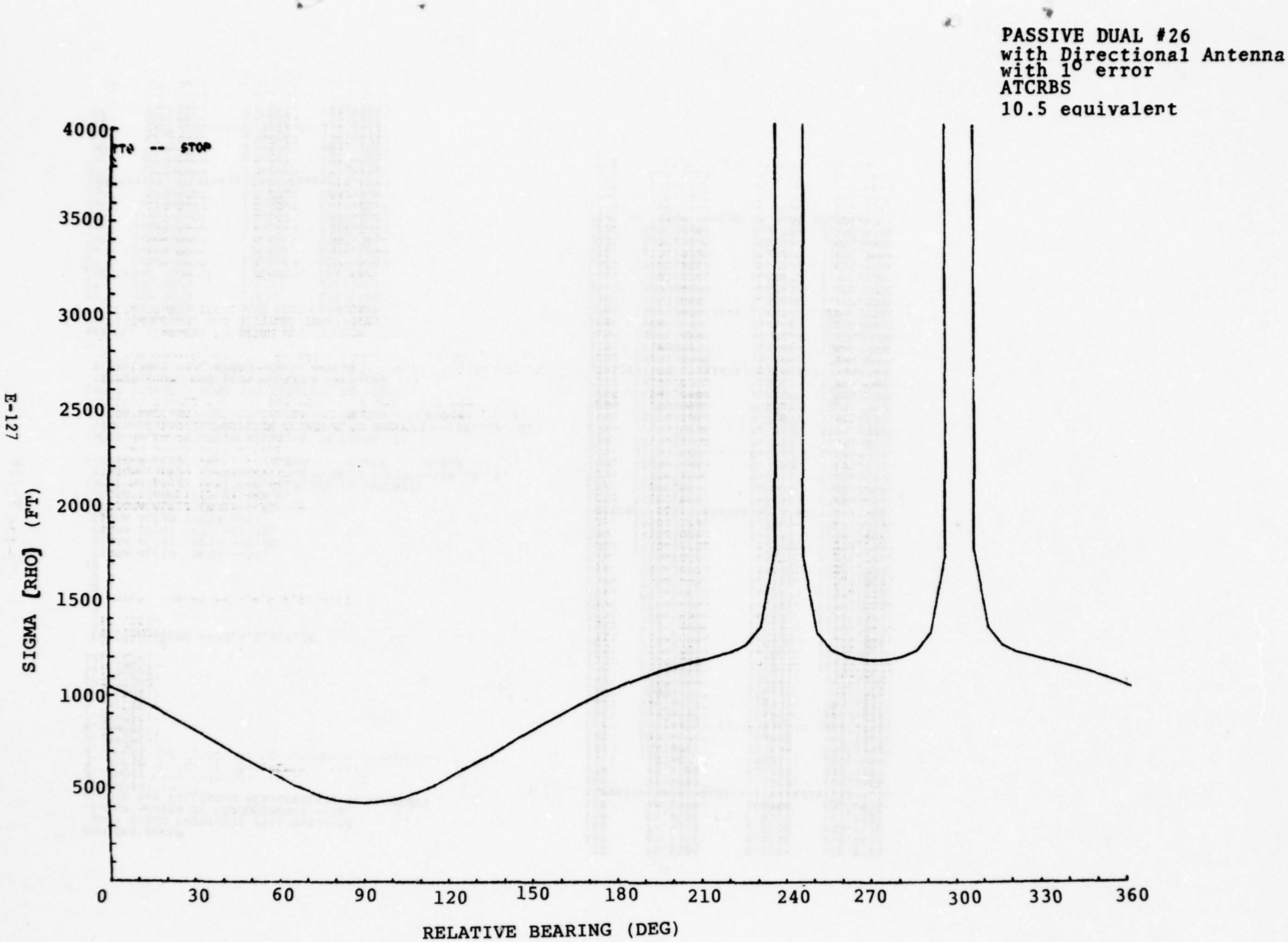


```
*RUN DK1:DUALP
  WANT DEBUG PRINTOUTS (Y=1,N=2)-->2
  ENTER NUMBER OF MEASUREMENTS -->7
CHOOSE THE FOLLOWING MEASUREMENTS BY NUMBER::
1..RHO10
2..RHO1T
3..ALF10
4..ALFD1
5..DTOA1
6..RHO20
7..RHO2T
8..ALF20
9..ALFD2
10..DTOA2
11..RHOOT
12..BETA

 ENTER NUMBERS -->3,4,5,8,9,10,11
 3
 4
 5
 8
 9
10
11
 SIGMA ALF10 (DEG) -->.1768
 SIGMA ALFD1 (DEG) -->.25
 SIGMA DTOA1 (FT) -->100.
 SIGMA ALF20 (DEG) -->.1768
 SIGMA ALFD2 (DEG) -->.25
 SIGMA DTOA2 (FT) -->100.
 SIGMA RHOOT (FT) -->100.
INPUT RADAR(2) POSITION RELATIVE TO RADAR(1)
 DISTANCE(NM), BEARING(DEG) AND HEIGHT(FT) -->50.,0.,0.
VECTOR RHOV12 -->        50.000     0.000      0.000

INPUT (OWN) POSITION RELATIVE TO RADAR (1)
 DISTANCE(NM), BEARING(DEG) AND ALTITUDE(FT) -->50.,60.,0.
VECTOR RHOV10 -->        25.000    43.301      0.000

INPUT (TARGET) POSITION RELATIVE TO (OWN)
 DISTANCE(NM) AND ALTITUDE(FT) -->10.,0.
 BETA START, INCREMENT (DEG) -->0,5

BETA      RANGE        BEARING      CEP
  0      100.0000      0.2059     240.1215
  5      100.0000      0.2108     244.8949
 10      100.0000      0.2171     251.0386
 15      100.0000      0.2247     258.4481
 20      100.0000      0.2335     267.0088
 25      100.0000      0.2432     276.5832
 30      100.0000      0.2537     286.9890
 35      100.0000      0.2647     297.9664
 40      100.0000      0.2758     309.1295
 45      100.0000      0.2865     319.9007
 50      100.0000      0.2960     329.4272
 55      100.0000      0.3030     336.4923
 60      100.0000**************************
 65      100.0000      0.3029     336.3879
 70      100.0000      0.2920     325.4274
 75      100.0000      0.2727     305.9736
 80      100.0000      0.2472     280.6176
 85      100.0000      0.2234     257.1985
 90      100.0000      0.2133     247.3090
 95      100.0000      0.2234     257.1285
100      100.0000      0.2478     280.6176
105      100.0000      0.2727     305.9736
110      100.0000      0.2920     325.4274
115      100.0000      0.3029     336.3879
120      100.0000**************************
125      100.0000      0.3030     336.4923
130      100.0000      0.2960     329.4272
135      100.0000      0.2865     319.9007
140      100.0000      0.2758     309.1295
145      100.0000      0.2647     297.9664
150      100.0000      0.2537     286.9890
155      100.0000      0.2432     276.5832
160      100.0000      0.2335     267.0088
165      100.0000      0.2247     258.4481
170      100.0000      0.2171     251.0386
175      100.0000      0.2108     244.8949
180      100.0000      0.2059     240.1215
185      100.0000      0.2024     236.8180
190      100.0000      0.2006     235.0763
195      100.0000      0.2005     234.9719
200      100.0000      0.2021     236.5466
205      100.0000      0.2055     239.7825
210      100.0000      0.2105     244.5696
215      100.0000      0.2167     250.6645
220      100.0000      0.2239     257.6459
225      100.0000      0.2313     264.8708
230      100.0000      0.2380     271.4465
235      100.0000      0.2428     276.2412
240      100.0000**************************
245      100.0000      0.2420     275.4721
250      100.0000      0.2345     268.0670
255      100.0000      0.2225     256.2820
260      100.0000      0.2083     242.4733
265      100.0000      0.1963     230.9182
270      100.0000      0.1915     226.3444
275      100.0000      0.1963     230.9182
280      100.0000      0.2083     242.4733
285      100.0000      0.2225     256.2820
290      100.0000      0.2345     268.0670
295      100.0000      0.2420     275.4721
300      100.0000**************************
305      100.0000      0.2428     276.2412
310      100.0000      0.2380     271.4465
315      100.0000      0.2313     264.8708
320      100.0000      0.2239     257.6459
325      100.0000      0.2167     250.6645
330      100.0000      0.2105     244.5696
335      100.0000      0.2055     239.7825
340      100.0000      0.2021     236.5466
345      100.0000      0.2005     234.9719
350      100.0000      0.2006     235.0763
355      100.0000      0.2024     236.8180
360      100.0000      0.2059     240.1215
TT0  --  STOP  --END OF DCAS PROGRAM--
>
```

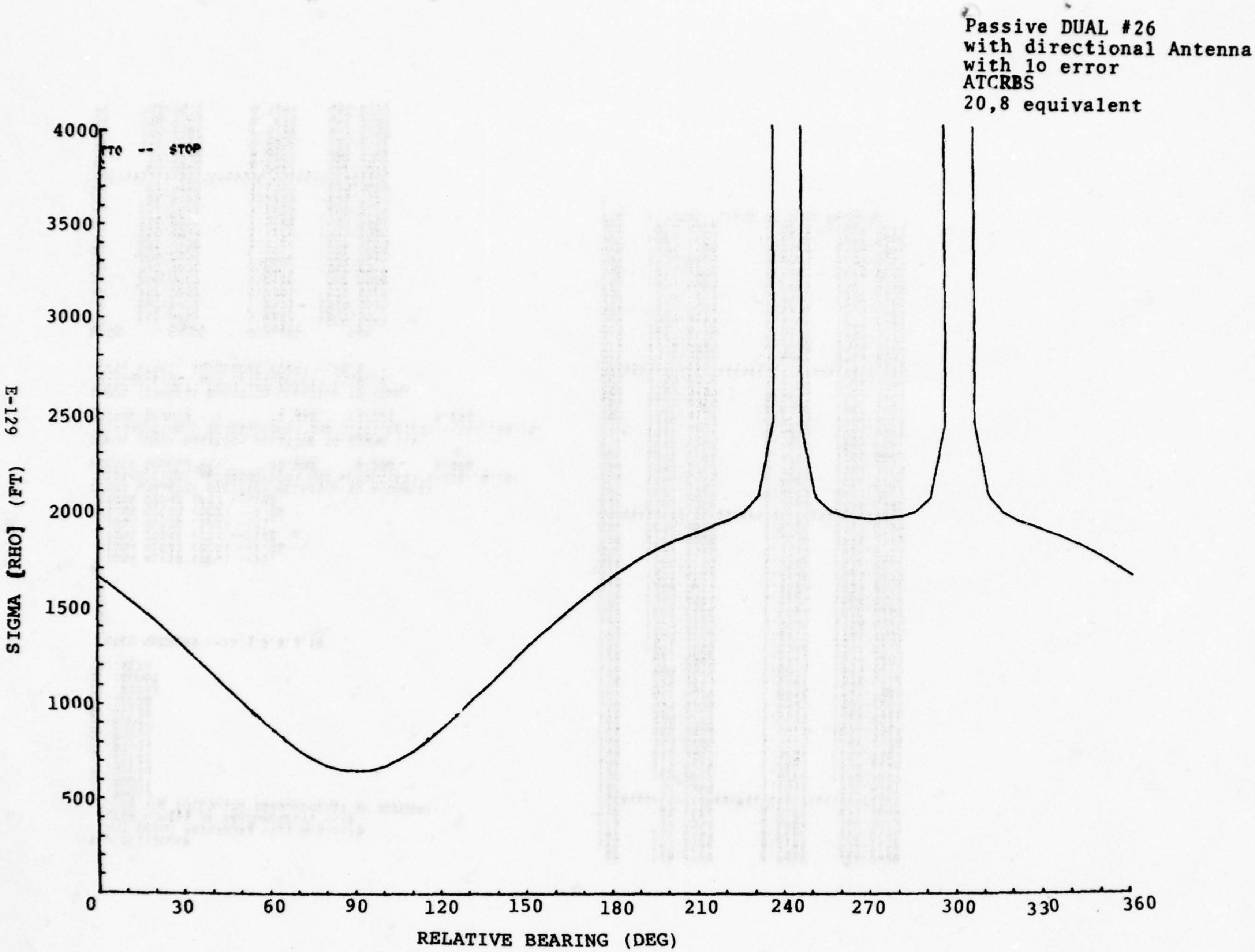
DUAL #26
SEMI-ACTIVE
ATCRBS
100,20 equivalent



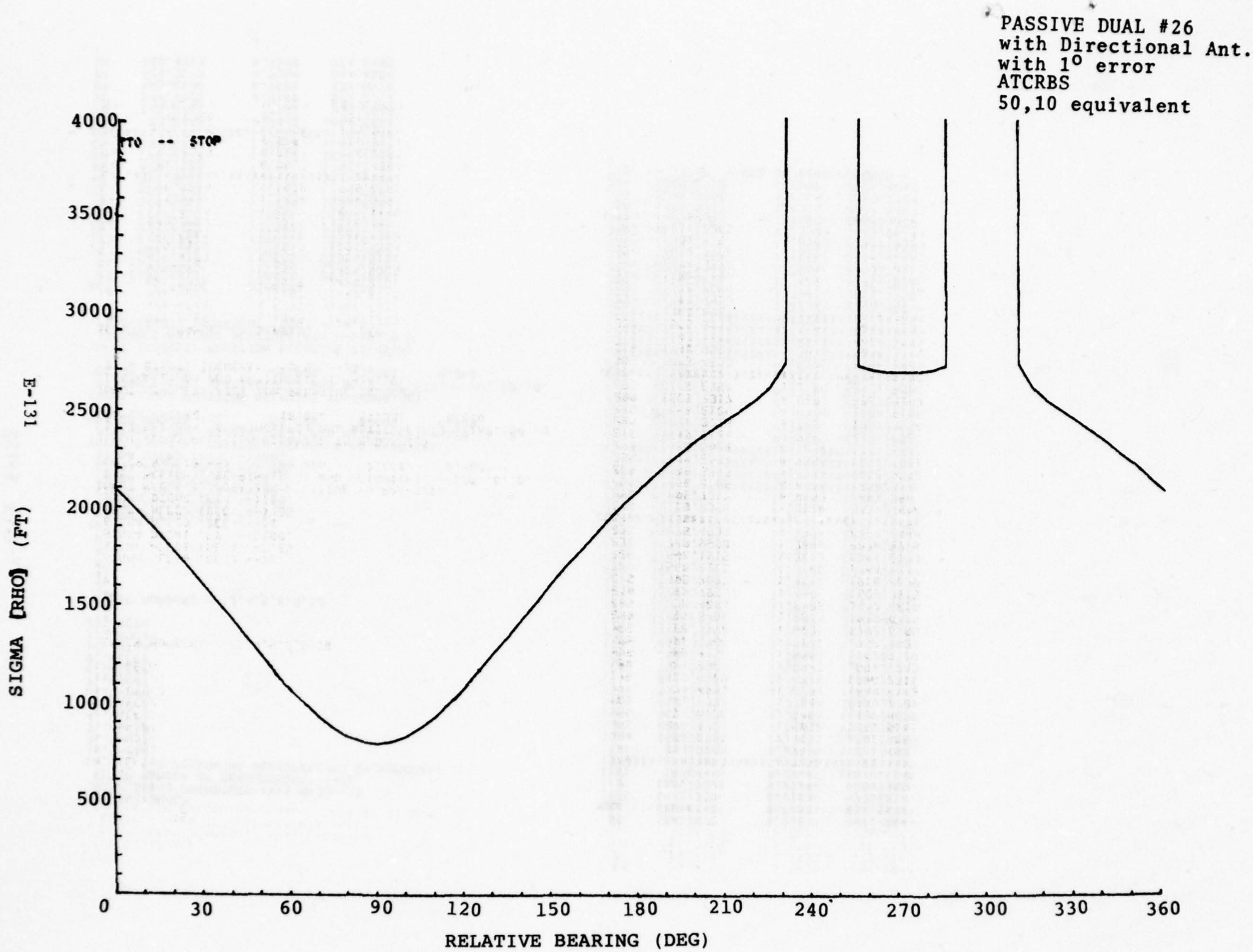
```
>RUN BALLCUMLP
 WANT DEBUG PRINTOUTS (Y=1/N=2)-->2
 ENTER NUMBER OF MEASUREMENTS -->7
CHOOSE THE FOLLOWING MEASUREMENTS BY NUMBER::
1..RHO10
2..RHO1T
3..ALF10
4..ALFD1
5..DTOA1
6..RHO20
7..RHO2T
8..ALF20
9..ALFD2
10..DTOA2
11..RHOOT
12..BETA

 ENTER NUMBERS -->3,4,5,8,9,10,11
 3
 4
 5
 8
 9
10
11
 SIGMA ALF10 (DEG) -->.1768
 SIGMA ALFD1 (DEG) -->.25
 SIGMA DTOA1 (FT) -->100.
 SIGMA ALF20 (DEG) -->.1768
 SIGMA ALFD2 (DEG) -->.25
 SIGMA DTOA2 (FT) -->100.
 SIGMA RHOOT (FT) -->100.
INPUT RADAR<2> POSITION RELATIVE TO RADAR<1>
 DISTANCE(NM), BEARING(DEG) AND HEIGHT(FT) -->100.,0.,0.
VECTOR RHOV12 -->      100.000      0.000      0.000

INPUT <OWN> POSITION RELATIVE TO RADAR (1>
 DISTANCE(NM), BEARING(DEG) AND ALTITUDE(FT) -->100.,60.,0.
VECTOR RHOV10 -->       50.000     86.603      0.000

INPUT <TARGET> POSITION RELATIVE TO <OWN>
 DISTANCE(NM) AND ALTITUDE(FT) -->20.,0.
 BETA START, INCREMENT (DEG) -->0,5

BETA      RANGE        BEARING       CEP
  0     100.0000       0.1683     370.5992
  5     100.0000       0.1712     376.6090
 10     100.0000       0.1755     385.3456
 15     100.0000       0.1809     396.5479
 20     100.0000       0.1874     409.9421
 25     100.0000       0.1949     425.2265
 30     100.0000       0.2030     442.0390
 35     100.0000       0.2116     459.9043
 40     100.0000       0.2205     478.1559
 45     100.0000       0.2290     495.8293
 50     100.0000       0.2365     511.5264
 55     100.0000       0.2422     523.2708
 60     100.0000****************************
 65     100.0000       0.2424     523.8179
 70     100.0000       0.2341     506.4679
 75     100.0000       0.2191     475.3250
 80     100.0000       0.1993     434.4670
 85     100.0000       0.1809     396.5154
 90     100.0000       0.1731     380.4236
 95     100.0000       0.1809     396.5154
100     100.0000       0.1993     434.4670
105     100.0000       0.2191     475.3250
110     100.0000       0.2341     506.4679
115     100.0000       0.2424     523.8179
120     100.0000****************************
125     100.0000       0.2422     523.2708
130     100.0000       0.2365     511.5264
135     100.0000       0.2290     495.8293
140     100.0000       0.2205     478.1559
145     100.0000       0.2116     459.9043
150     100.0000       0.2030     442.0390
155     100.0000       0.1949     425.2265
160     100.0000       0.1874     409.9421
165     100.0000       0.1809     396.5479
170     100.0000       0.1756     385.3456
175     100.0000       0.1712     376.6090
180     100.0000       0.1683     370.5992
185     100.0000       0.1668     367.5644
190     100.0000       0.1668     367.7245
195     100.0000       0.1686     371.2413
200     100.0000       0.1720     378.1752
205     100.0000       0.1770     388.4311
210     100.0000       0.1834     401.6930
215     100.0000       0.1910     417.3504
220     100.0000       0.1993     434.4171
225     100.0000       0.2076     451.4524
230     100.0000       0.2148     466.5058
235     100.0000       0.2200     477.1344
240     100.0000****************************
245     100.0000       0.2186     474.2313
250     100.0000       0.2100     456.5257
255     100.0000       0.1964     428.3681
260     100.0000       0.1801     394.8564
265     100.0000       0.1661     366.1565
270     100.0000       0.1604     354.5863
275     100.0000       0.1661     366.1565
280     100.0000       0.1801     394.8564
285     100.0000       0.1964     428.3681
290     100.0000       0.2100     456.5257
295     100.0000       0.2186     474.2313
300     100.0000****************************
305     100.0000       0.2200     477.1344
310     100.0000       0.2148     466.5058
315     100.0000       0.2076     451.4524
320     100.0000       0.1993     434.4171
325     100.0000       0.1910     417.3504
330     100.0000       0.1834     401.6930
335     100.0000       0.1770     388.4311
340     100.0000       0.1720     378.1752
345     100.0000       0.1686     371.2413
350     100.0000       0.1668     367.7245
355     100.0000       0.1668     367.5644
360     100.0000       0.1683     370.5992
TT0  --  STOP  --END OF BCAS PROGRAM--
>
```


PASSIVE DUAL #26
with Directional Antenna
with 1° error
ATCRBS
10.5 equivalent
FT0 -- STOP
4000
3500
3000
2500
2000
1500
1000
500
SIGMA [RHO] (FT)
0
30
60
90
120
150
180
210
240
270
300
330
360
RELATIVE BEARING (DEG)

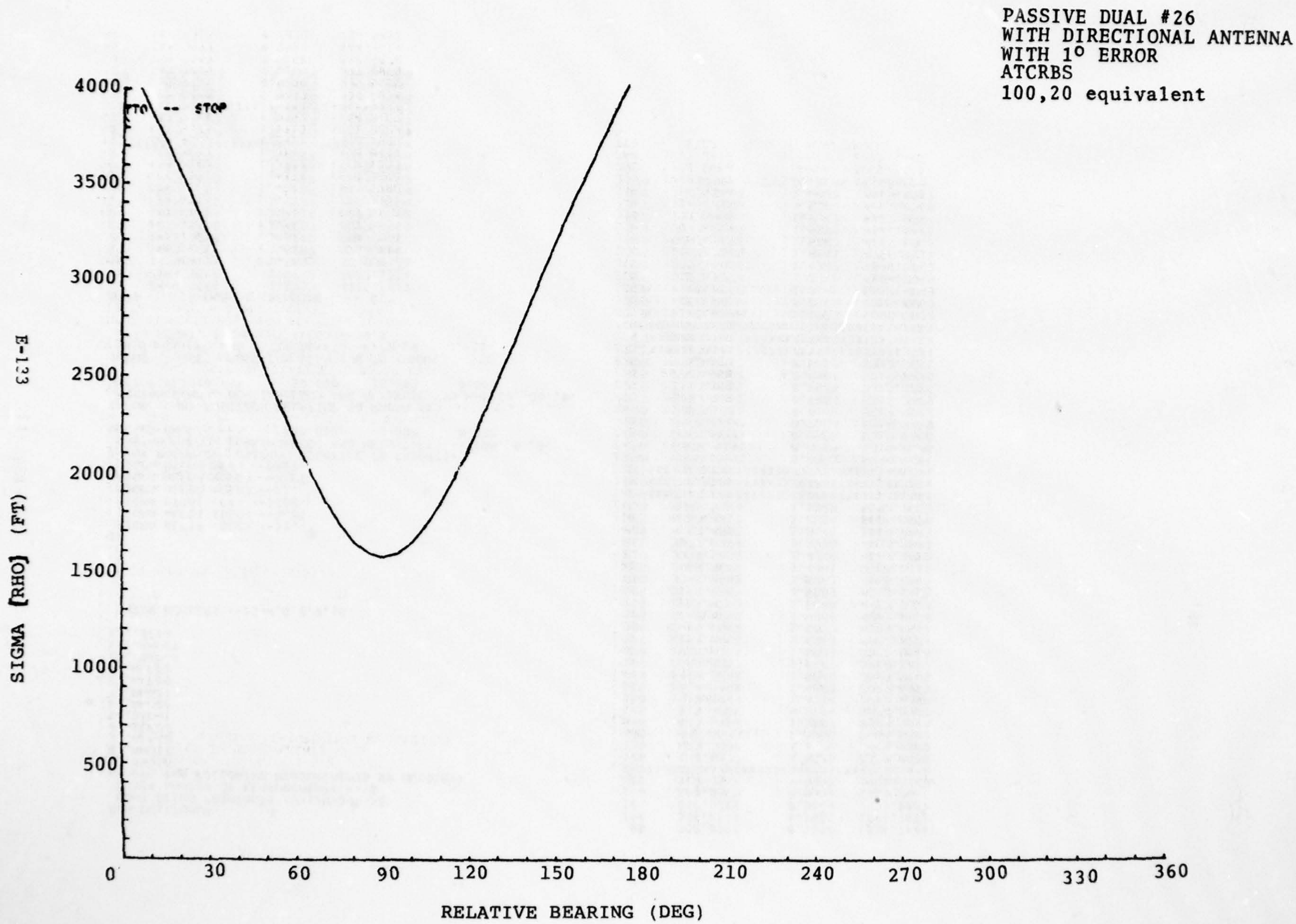
```
.RUN DK1:DUALP
 WANT DEBUG PRINTOUTS (Y=1/N=2)-->2
 ENTER NUMBER OF MEASUREMENTS -->6
CHOOSE THE FOLLOWING MEASUREMENTS BY NUMBER::
1..RHO10
2..RHO1T
3..ALF10
4..ALFD1
5..DTOA1
6..RHO20
7..RHO2T
8..ALF20
9..ALFD2
10..DTOA2
11..RHOOT
12..BETA

 ENTER NUMBERS -->3,4,5,8,9,10
 3
 4
 5
 8
 9
10
 SIGMA ALF10 (DEG) -->1.
 SIGMA ALFD1 (DEG) -->.25
 SIGMA DTOA1 (FT) -->100.
 SIGMA ALF20 (DEG) -->1.
 SIGMA ALFD2 (DEG) -->.25
 SIGMA DTOA2 (FT) -->100.
INPUT RADAR(2) POSITION RELATIVE TO RADAR(1)
 DISTANCE(NM), BEARING(DEG) AND HEIGHT(FT) -->10.,0.,0.
VECTOR RHOV12 -->      10.000     0.000     0.000

INPUT (OWN) POSITION RELATIVE TO RADAR (1)
 DISTANCE(NM), BEARING(DEG) AND ALTITUDE(FT) -->10.,60.,0.
VECTOR RHOV10 -->       5.000     8.660     0.000

INPUT (TARGET) POSITION RELATIVE TO (OWN)
 DISTANCE(NM) AND ALTITUDE(FT) -->5.,0.
 BETA START, INCREMENT (DEG) -->0,5

BETA      RANGE       BEARING       CEP
  0    563.3666      1.6652    1047.3573
  5    507.8878      1.6571    1014.9027
 10    452.7237      1.6391     979.9726
 15    398.3927      1.6115     942.7869
 20    345.4028      1.5747     903.6014
 25    294.2535      1.5294     862.7066
 30    245.4438      1.4764     820.4290
 35    199.4944      1.4165     777.1369
 40    156.9991      1.3508     733.2498
 45    118.7512      1.2804     689.2524
 50     86.0700      1.2069     645.7127
 55     61.6053      1.1318     603.3056
60************************************
 65     52.8890      0.9856     525.2839
 70     63.4535      0.9197     491.7786
 75     74.9283      0.8629     463.6176
 80     84.2305      0.8186     442.1632
 85     90.1324      0.7904     428.6750
 90     92.1442      0.7807     424.0666
 95     90.1324      0.7904     428.6750
100     84.2305      0.8186     442.1632
105     74.9283      0.8629     463.6176
110     63.4535      0.9197     491.7786
115     52.8890      0.9856     525.2839
120***********************************
125     61.6053      1.1318     603.3056
130     86.0700      1.2069     645.7127
135    118.7512      1.2804     689.2524
140    156.9991      1.3508     733.2498
145    199.4944      1.4165     777.1369
150    245.4438      1.4764     820.4290
155    294.2535      1.5294     862.7066
160    345.4028      1.5747     903.6014
165    398.3927      1.6115     942.7869
170    452.7237      1.6391     979.9726
175    507.8878      1.6571    1014.9027
180    563.3666      1.6652    1047.3573
185    618.6364      1.6630    1077.1606
190    673.1798      1.6507    1104.1945
195    726.5061      1.6284    1128.4263
200    778.1896      1.5967    1149.9581
205    827.9427      1.5567    1169.1226
210    875.7655      1.5102    1186.6872
215    922.3008      1.4606    1204.3390
220    969.8174      1.4146    1226.0401
225   1025.6428      1.3891    1262.7314
230   1118.8807      1.4408    1354.8286
235   1448.4884      1.9001    1764.4247
240***********************************
245   1497.2836      1.6211    1726.4900
250   1197.3197      1.0536    1321.2315
255   1138.9359      0.8818    1231.1743
260   1121.4131      0.7963    1198.2617
265   1115.4629      0.7512    1184.4412
270   1113.9903      0.7367    1180.4973
275   1115.4629      0.7512    1184.4412
280   1121.4131      0.7963    1198.2617
285   1138.9359      0.8818    1231.1743
290   1197.3197      1.0536    1321.2315
295   1497.2836      1.6211    1726.4900
300***********************************
305   1448.4884      1.9001    1764.4247
310   1118.8807      1.4408    1354.8286
315   1025.6428      1.3891    1262.7314
320    969.8174      1.4146    1226.0401
325    922.3008      1.4606    1204.3390
330    875.7655      1.5102    1186.6872
335    827.9427      1.5567    1169.1226
340    778.1896      1.5967    1149.9581
345    726.5061      1.6284    1128.4263
350    673.1798      1.6507    1104.1945
355    618.6364      1.6630    1077.1606
360    563.3666      1.6652    1047.3573
TT0  --  STOP  --END OF BCAS PROGRAM--
>
```


Passive DUAL #26
with directional Antenna
with 1σ error
ATCRBS
20,8 equivalent
TO -- STOP
4000
3500
3000
2500
2000
1500
1000
500
0
30
60
90
120
150
180
210
240
270
300
330
360
SIGMA [RHO] (FT)
RELATIVE BEARING (DEG)

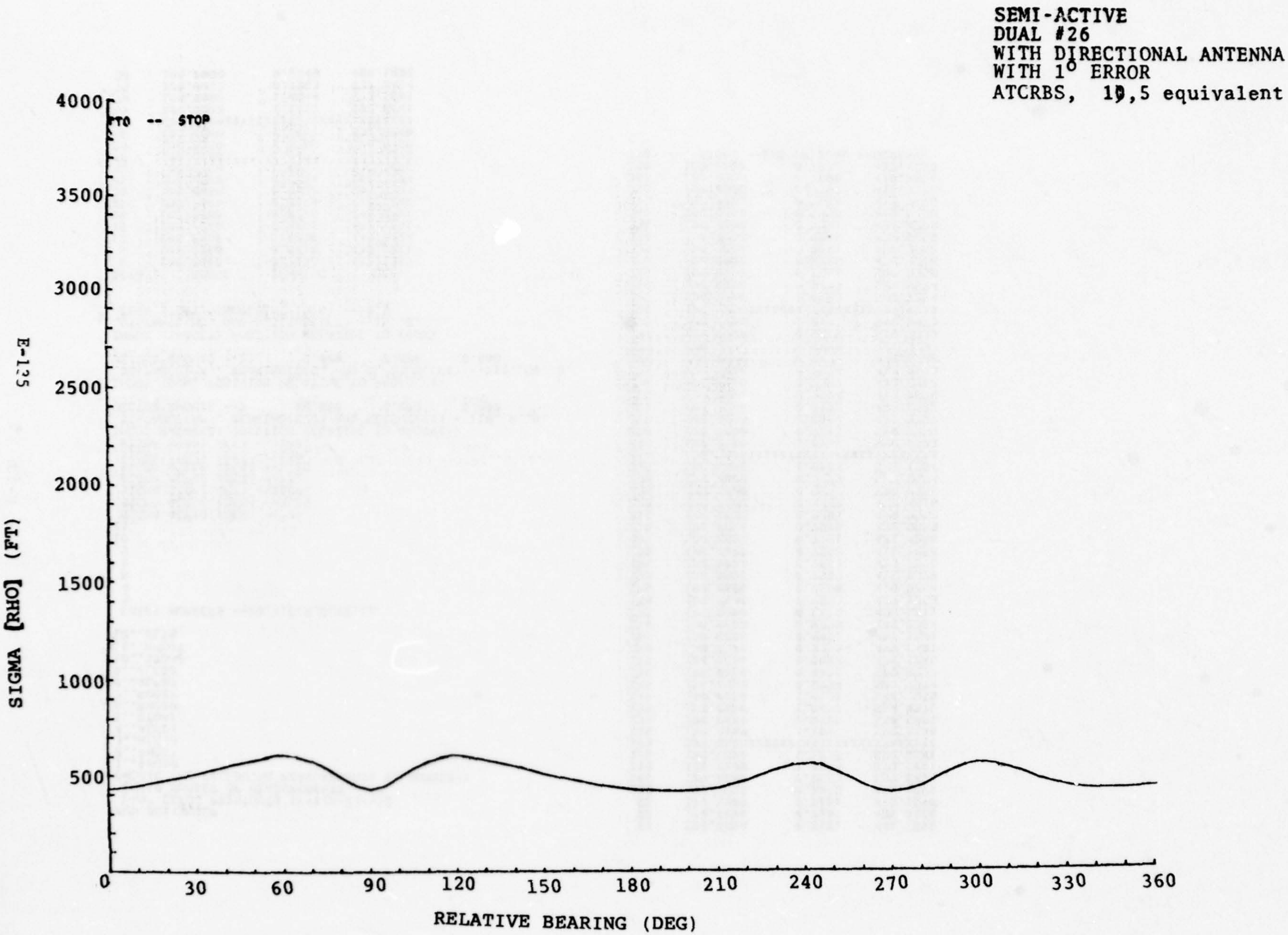
```
:RUN DK1:DUALP
 WANT DEBUG PRINTOUTS (Y=1/N=2)-->2
 ENTER NUMBER OF MEASUREMENTS -->6
CHOOSE THE FOLLOWING MEASUREMENTS BY NUMBER::
1..RHO10
2..RHO1T
3..ALF10
4..ALFD1
5..DTOA1
6..RHO20
7..RHO2T
8..ALF20
9..ALFD2
10..DTOA2
11..RHOOT
12..BETA

 ENTER NUMBERS -->3,4,5,8,9,10
 3
 4
 5
 8
 9
10
 SIGMA ALF10 (DEG) -->1.
 SIGMA ALFD1 (DEG) -->.25
 SIGMA DTOA1 (FT) -->100.
 SIGMA ALF20 (DEG) -->1.
 SIGMA ALFD2 (DEG) -->.25
 SIGMA DTOA2 (FT) -->100.
INPUT RADAR(2) POSITION RELATIVE TO RADAR(1)
 DISTANCE(NM), BEARING(DEG) AND HEIGHT(FT) -->20.,0.,0.
VECTOR RHOV12 -->        20.000      0.000      0.000

INPUT (OWN) POSITION RELATIVE TO RADAR (1)
 DISTANCE(NM), BEARING(DEG) AND ALTITUDE(FT) -->20.,60.,0.
VECTOR RHOV10 -->        10.000     17.321      0.000

INPUT (TARGET) POSITION RELATIVE TO (OWN)
 DISTANCE(NM) AND ALTITUDE(FT) -->8.,0.
 BETA START, INCREMENT (DEG) -->0,5

BETA      RANGE        BEARING       CEP
  0     911.2365       1.6343    1659.1223
  5     820.6508       1.6275    1606.2311
 10     730.4803       1.6107    1549.5113
 15     641.5370       1.5842    1489.2781
 20     554.6136       1.5484    1425.9028
 25     470.4793       1.5038    1359.8111
 30     389.8828       1.4513    1291.4884
 35     313.5665       1.3915    1221.4882
 40     242.3083       1.3256    1150.4487
 45     177.0418       1.2547    1079.1148
 50     119.2625       1.1802    1008.3697
 55      72.7380       1.1038     939.2761
 60**************************************
 65      62.4624       0.9537     811.4894
 70      87.8339       0.8854     756.2563
 75     111.3183       0.8261     709.6131
 80     129.1161       0.7796     673.9158
 85     140.0720       0.7498     651.3898
 90     143.7619       0.7395     643.6773
 95     140.0720       0.7498     651.3898
100     129.1161       0.7796     673.9158
105     111.3183       0.8261     709.6131
110      87.8339       0.8854     756.2563
115      62.4624       0.9537     811.4894
120**************************************
125      72.7380       1.1038     939.2761
130     119.2625       1.1802    1008.3697
135     177.0418       1.2547    1079.1148
140     242.3083       1.3256    1150.4487
145     313.5665       1.3915    1221.4882
150     389.8828       1.4513    1291.4884
155     470.4793       1.5038    1359.8111
160     554.6136       1.5484    1425.9028
165     641.5370       1.5842    1489.2781
170     730.4803       1.6107    1549.5113
175     820.6508       1.6275    1606.2311
180     911.2365       1.6343    1659.1223
185    1001.4152       1.6308    1707.9319
190    1090.3706       1.6171    1752.4827
195    1177.3178       1.5935    1792.6985
200    1261.5406       1.5604    1828.6469
205    1342.4664       1.5185    1860.6216
210    1419.7953       1.4692    1889.3115
215    1493.8087       1.4146    1916.2039
220    1566.2115       1.3588    1944.7237
225    1643.1115       1.3113    1984.2773
230    1749.9998       1.3040    2070.3719
235    2075.4633       1.5395    2452.2480
240**************************************
245    2159.2350       1.3180    2431.5802
250    1895.7317       0.9603    2063.3863
255    1856.2185       0.8406    1988.5156
260    1849.3773       0.7735    1962.3550
265    1849.2184       0.7355    1951.6621
270    1849.6028       0.7230    1948.6491
275    1849.2184       0.7355    1951.6621
280    1849.3773       0.7735    1962.3550
285    1856.2185       0.8406    1988.5156
290    1895.7317       0.9603    2063.3863
295    2159.2350       1.3180    2431.5802
300**************************************
305    2075.4633       1.5395    2452.2480
310    1749.9998       1.3040    2070.3719
315    1643.1115       1.3113    1984.2773
320    1566.2115       1.3588    1944.7237
325    1493.8087       1.4146    1916.2039
330    1419.7953       1.4692    1889.3115
335    1342.4664       1.5185    1860.6216
340    1261.5406       1.5604    1828.6469
345    1177.3172       1.5935    1792.6985
350    1090.3706       1.6171    1752.4827
355    1001.4152       1.6308    1707.9319
360     911.2365       1.6343    1659.1223
TT0  -- STOP  --END OF BCAS PROGRAM--
>
```


PASSIVE DUAL #26
with Directional Ant.
with 1° error
ATCRBS
50,10 equivalent
TO -- STOP
SIGMA (RHO) (FT)
4000
3500
3000
2500
2000
1500
1000
500
0
30
60
90
120
150
180
210
240
270
300
330
360
RELATIVE BEARING (DEG)

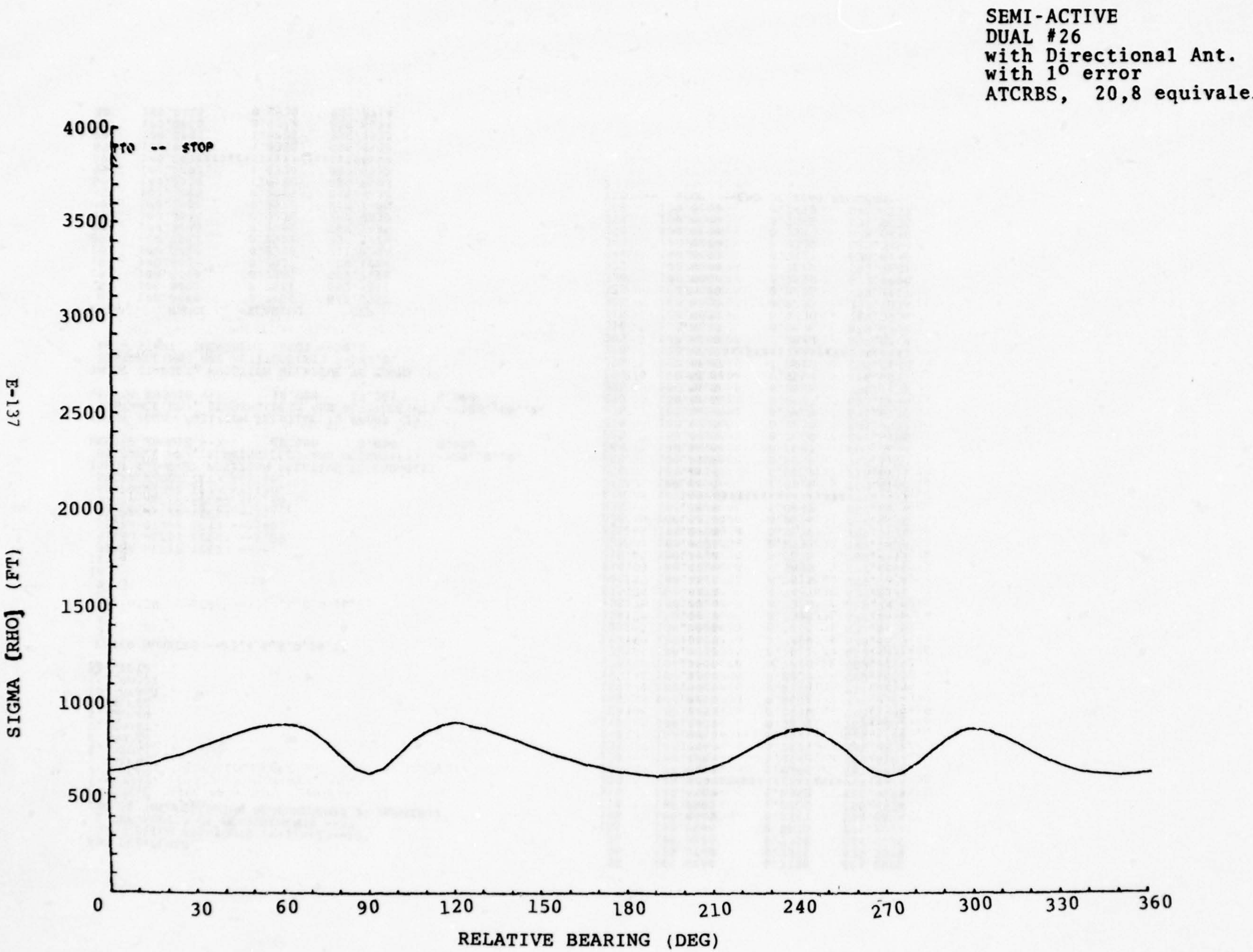
```
*RUN DK1:DUALP
 WANT DEBUG PRINTOUTS (Y=1/N=2)-->2
 ENTER NUMBER OF MEASUREMENTS -->6
CHOOSE THE FOLLOWING MEASUREMENTS BY NUMBER::
1..RHO10
2..RHO1T
3..ALF10
4..ALFD1
5..DTOA1
6..RHO20
7..RHO2T
8..ALF20
9..ALFD2
10..DTOA2
11..RHOOT
12..BETA

 ENTER NUMBERS -->3,4,5,8,9,10
 3
 4
 5
 8
 9
10
 SIGMA ALF10 (DEG) -->1.
 SIGMA ALFD1 (DEG) -->.25
 SIGMA DTOA1 (FT) -->100.
 SIGMA ALF20 (DEG) -->1.
 SIGMA ALFD2 (DEG) -->.25
 SIGMA DTOA2 (FT) -->100.
INPUT RADAR(2) POSITION RELATIVE TO RADAR(1)
 DISTANCE(NM), BEARING(DEG) AND HEIGHT(FT) -->50.,0.,0.
VECTOR RHOV12 -->        50.000      0.000      0.000

INPUT (OWN) POSITION RELATIVE TO RADAR (1)
 DISTANCE(NM), BEARING(DEG) AND ALTITUDE(FT) -->50.,60.,0.
VECTOR RHOV10 -->        25.000     43.301      0.000

INPUT (TARGET) POSITION RELATIVE TO (OWN)
 DISTANCE(NM) AND ALTITUDE(FT) -->10.,0.
 BETA START, INCREMENT (DEG) -->0,5

BETA      RANGE       BEARING      CEP
  0    1208.2012      1.6097    2091.4048
  5    1087.3753      1.6043    2019.1510
 10     967.3721      1.5892    1943.2003
 15     849.1442      1.5645    1863.8172
 20     733.6392      1.5307    1781.3391
 25     621.7918      1.4881    1696.1782
 30     514.5207      1.4374    1608.8292
 35     412.7349      1.3793    1519.8823
 40     317.3633      1.3149    1430.0429
 45     229.4529      1.2451    1340.1595
 50     150.5373      1.1713    1251.2629
 55      84.5314      1.0953    1164.6167
 60****************************************
 65      72.6440      0.9449    1004.6654
 70     110.9701      0.8760     935.5989
 75     144.4015      0.8160     877.2859
 80     169.2140      0.7688     832.6572
 85     184.3577      0.7384     804.4924
 90     189.4413      0.7279     794.8485
 95     184.3577      0.7384     804.4924
100     169.2140      0.7688     832.6572
105     144.4015      0.8160     877.2859
110     110.9701      0.8760     935.5989
115      72.6440      0.9449    1004.6654
120****************************************
125      84.5314      1.0953    1164.6167
130     150.5373      1.1713    1251.2629
135     229.4529      1.2451    1340.1595
140     317.3633      1.3149    1430.0429
145     412.7349      1.3793    1519.8823
150     514.5207      1.4374    1608.8292
155     621.7918      1.4881    1696.1782
160     733.6392      1.5307    1781.3391
165     849.1442      1.5645    1863.8172
170     967.3721      1.5892    1943.2003
175    1087.3753      1.6043    2019.1510
180    1208.2012      1.6097    2091.4048
185    1328.9056      1.6054    2159.7724
190    1448.5707      1.5915    2224.1487
195    1566.3308      1.5682    2284.5329
200    1681.4132      1.5360    2341.0674
205    1793.2098      1.4958    2394.1189
210    1901.4252      1.4486    2444.4608
215    2006.4300      1.3964    2493.7311
220    2110.2770      1.3427    2545.7626
225    2220.3640      1.2961    2611.3735
230    2368.0330      1.2855    2732.4084
235****************************************
240****************************************
245****************************************
250****************************************
255    2569.6517      0.8385    2719.1581
260    2568.9646      0.7725    2696.4158
265    2573.6289      0.7345    2688.9126
270    2575.7558      0.7218    2687.0958
275    2573.6289      0.7345    2688.9126
280    2568.9646      0.7725    2696.4158
285    2569.6517      0.8385    2719.1581
290****************************************
295****************************************
300****************************************
305****************************************
310    2368.0330      1.2855    2732.4084
315    2220.3640      1.2961    2611.3735
320    2110.2770      1.3427    2545.7626
325    2006.4300      1.3964    2493.7311
330    1901.4252      1.4486    2444.4608
335    1793.2098      1.4958    2394.1189
340    1681.4132      1.5360    2341.0674
345    1566.3308      1.5682    2284.5329
350    1448.5707      1.5915    2224.1487
355    1328.9056      1.6054    2159.7724
360    1208.2012      1.6097    2091.4048
TT0  --  STOP  --END OF BCAS PROGRAM--
>
```


PASSIVE DUAL #26
WITH DIRECTIONAL ANTENNA
WITH 1° ERROR
ATCRBS
100,20 equivalent
STOP
SIGMA [RHO] (FT)
4000
3500
3000
2500
2000
1500
1000
500
0
30
60
90
120
150
180
210
240
270
300
330
360
RELATIVE BEARING (DEG)

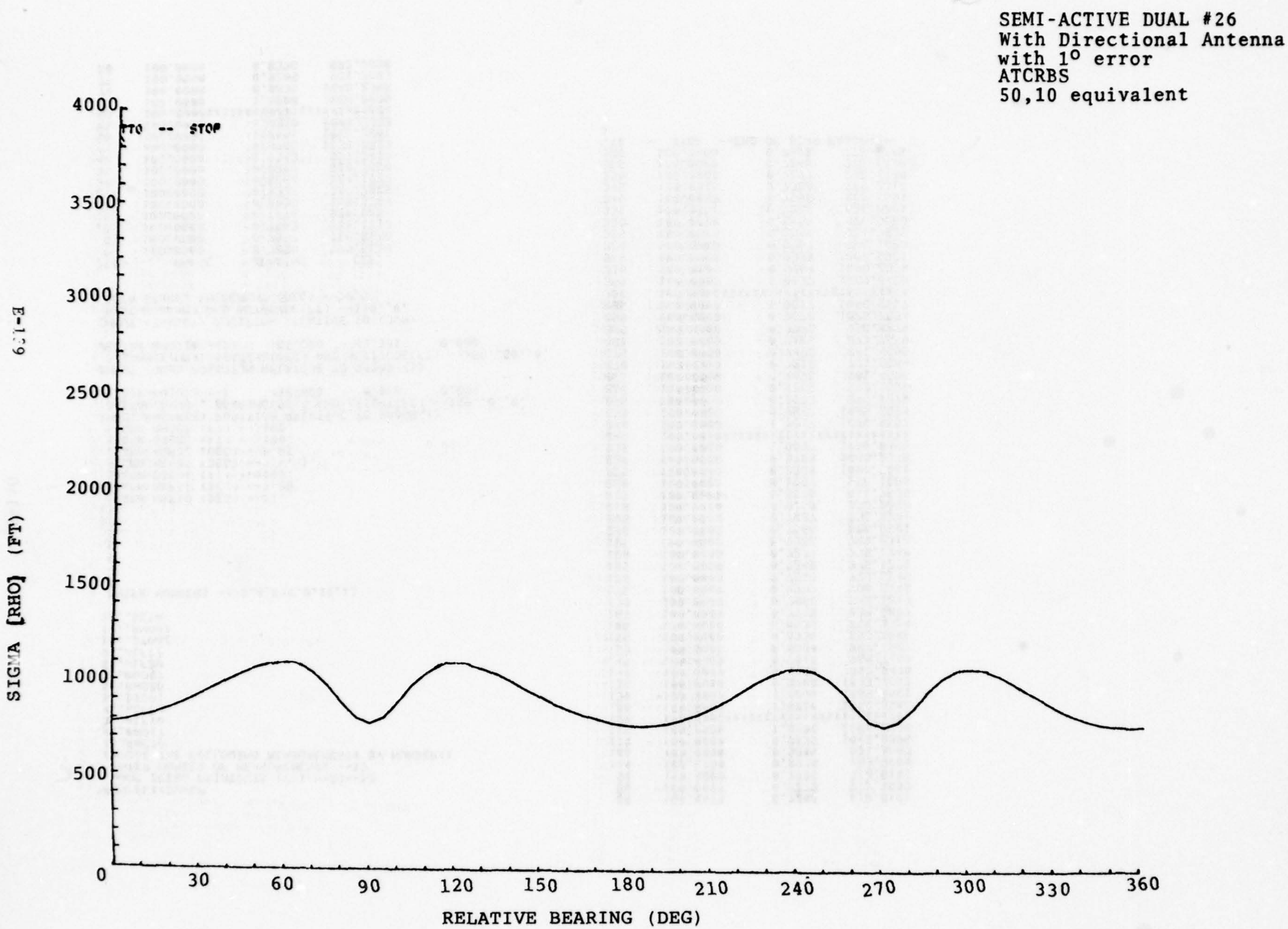
```
:RUN DK1:DUALP
 WANT DEBUG PRINTOUTS (Y=1/N=2)-->2
 ENTER NUMBER OF MEASUREMENTS -->6
CHOOSE THE FOLLOWING MEASUREMENTS BY NUMBER::
1..RHO10
2..RHO1T
3..ALF10
4..ALFD1
5..DTOA1
6..RHO20
7..RHO2T
8..ALF20
9..ALFD2
10..DTOA2
11..RHOOT
12..BETA

 ENTER NUMBERS -->3,4,5,8,9,10
 3
 4
 5
 8
 9
10
 SIGMA ALF10 (DEG) -->1.
 SIGMA ALFD1 (DEG) -->.25
 SIGMA DTOA1 (FT) -->100.
 SIGMA ALF20 (DEG) -->1.
 SIGMA ALFD2 (DEG) -->.25
 SIGMA DTOA2 (FT) -->100.
INPUT RADAR(2) POSITION RELATIVE TO RADAR(1)
 DISTANCE(NM), BEARING(DEG) AND HEIGHT(FT) -->100.,0.,0.
VECTOR RHOV12 -->      100.000      0.000      0.000

INPUT <OWN> POSITION RELATIVE TO RADAR (1)
 DISTANCE(NM), BEARING(DEG) AND ALTITUDE(FT) -->100.,60.,0.
VECTOR RHOV10 -->       50.000     86.603      0.000

INPUT <TARGET> POSITION RELATIVE TO <OWN>
 DISTANCE(NM) AND ALTITUDE(FT) -->20.,0.
 BETA START, INCREMENT (DEG) -->0,5

BETA      RANGE       BEARING       CEP
 0    2405.9506      1.6033    4165.6517
 5    2164.9666      1.5982    4022.1224
10    1925.4174      1.5833    3870.9128
15    1689.2357      1.5587    3712.6081
20    1458.3248      1.5249    3547.9195
25    1234.5408      1.4823    3377.6953
30    1019.6794      1.4316    3202.9392
35     815.4685      1.3734    3024.8390
40     623.5751      1.3087    2844.8074
45     445.6533      1.2386    2664.5403
50     283.5636      1.1645    2486.0966
55     140.8277      1.0880    2312.0020
60*****************************************
65     120.9928      0.9366    1990.0780
70     208.8398      0.8670    1850.7941
75     279.9928      0.8064    1733.0267
80     331.6148      0.7586    1642.7698
85     362.8382      0.7278    1585.7444
90     373.2838      0.7172    1566.2056
95     362.8382      0.7278    1585.7444
100    331.6148      0.7586    1642.7698
105    279.9928      0.8064    1733.0267
110    208.8398      0.8670    1850.7941
115    120.9928      0.9366    1990.0780
120****************************************
125    140.8277      1.0880    2312.0020
130    283.5636      1.1645    2486.0966
135    445.6533      1.2386    2664.5403
140    623.5751      1.3087    2844.8074
145    815.4685      1.3734    3084.8390
150   1019.6794      1.4316    3202.9392
155   1234.5408      1.4823    3377.6953
160   1458.3248      1.5249    3547.9195
165   1689.2357      1.5587    3712.6081
170   1925.4174      1.5833    3870.9128
175   2164.9666      1.5982    4022.1224
180   2405.9506      1.6033    4165.6517
185   2646.4286      1.5986    4301.0370
190   2884.4773      1.5840    4427.9374
195   3118.2207      1.5598    4546.1426
200   3345.8682      1.5263    4665.6912
205   3565.7689      1.4841    4756.4111
210   3776.5030      1.4340    4849.0098
215   3977.0774      1.3770    4934.3049
220   4167.4592      1.3148    5014.4043
225   4350.4819      1.2504    5095.0990
230   4541.7144      1.1928    5198.7633
235****************************************
240****************************************
245****************************************
250   4999.7847      0.8853    5340.7681
255   5029.4382      0.8104    5315.0446
260   5064.9205      0.7580    5313.9266
265   5088.8757      0.7254    5316.3479
270   5097.1621      0.7142    5317.4928
275   5088.8757      0.7254    5316.3479
280   5064.9205      0.7580    5313.9266
285   5029.4382      0.8104    5315.0446
290   4999.7847      0.8853    5340.7681
295****************************************
300****************************************
305****************************************
310   4541.7144      1.1928    5198.7633
315   4350.4819      1.2504    5095.0990
320   4167.4592      1.3148    5014.4043
325   3977.0774      1.3770    4934.3049
330   3776.5030      1.4340    4849.0098
335   3565.7689      1.4841    4756.4111
340   3345.8682      1.5263    4655.5912
345   3118.2207      1.5598    4546.1426
350   2884.4773      1.5840    4427.9374
355   2646.4286      1.5986    4301.0370
360   2405.9506      1.6033    4165.6517
TT0  --  STOP  --END OF BCAS PROGRAM--
>
```


SEMI-ACTIVE
DUAL #26
WITH DIRECTIONAL ANTENNA
WITH 1° ERROR
ATCRBS, 10,5 equivalent
FTO -- STOP
4000
3500
3000
2500
2000
1500
1000
500
0
SIGMA [RHO] (FT)
30
60
90
120
150
180
210
240
270
300
330
360
RELATIVE BEARING (DEG)

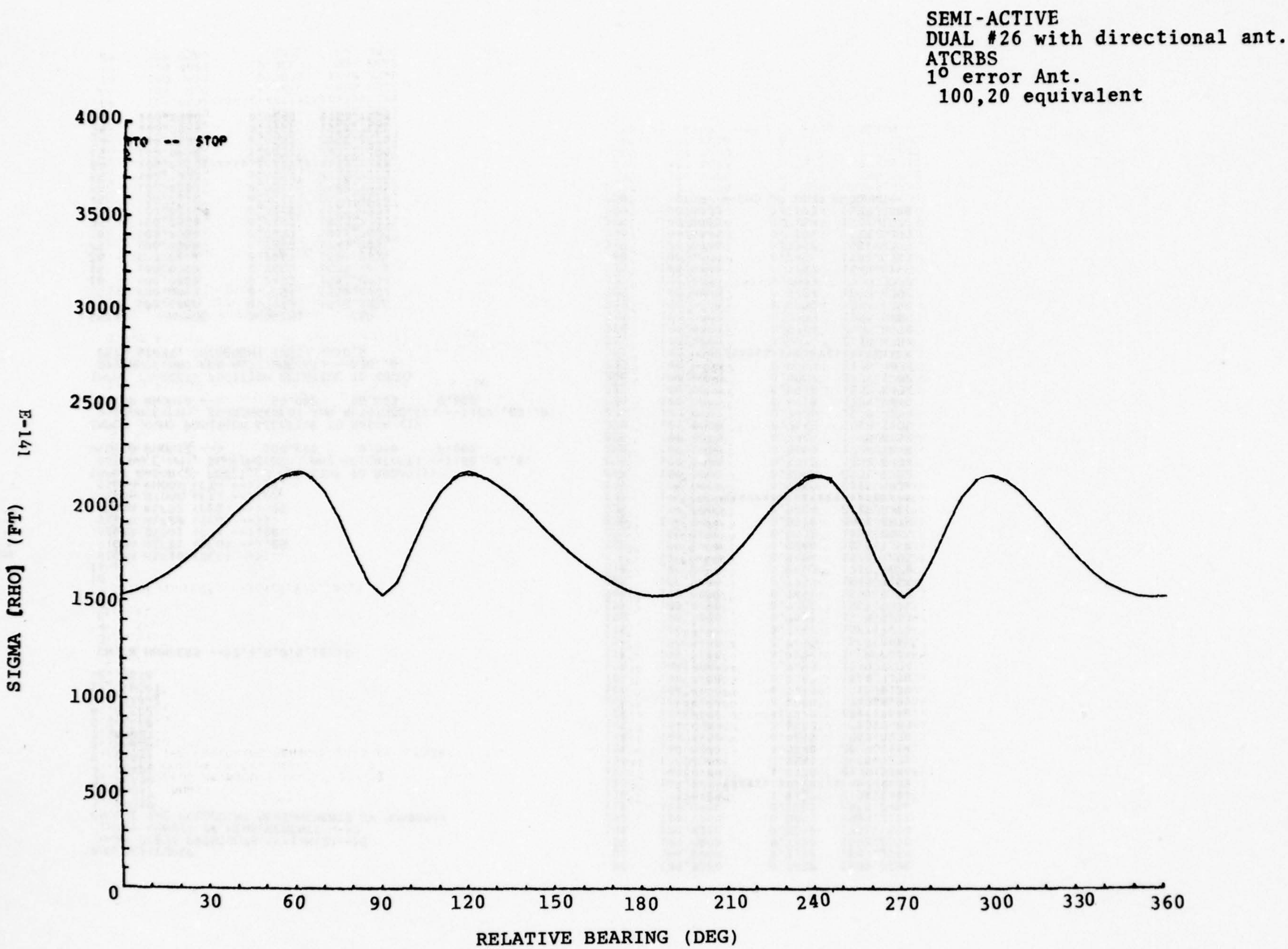
```
>RUN DK1:DUALP
  WANT DEBUG PRINTOUTS (Y=1/N=2)-->2
  ENTER NUMBER OF MEASUREMENTS -->7
 CHOOSE THE FOLLOWING MEASUREMENTS BY NUMBER::
 1..RHO10
 2..RHO1T
 3..ALF10
 4..ALFD1
 5..DTOA1
 6..RHO20
 7..RHO2T
 8..ALF20
 9..ALFD2
 10..DTOA2
 11..RHOOT
 12..BETA

  ENTER NUMBERS -->3,4,5,8,9,10,11
  3
  4
  5
  8
  9
  10
  11
   SIGMA ALF10 (DEG) -->1.
   SIGMA ALFD1 (DEG) -->.25
   SIGMA DTOA1 (FT) -->100.
   SIGMA ALF20 (DEG) -->1.
   SIGMA ALFD2 (DEG) -->.25
   SIGMA DTOA2 (FT) -->100.
   SIGMA RHOOT (FT) -->100.
 INPUT RADAR(2) POSITION RELATIVE TO RADAR(1)
   DISTANCE(NM), BEARING(DEG) AND HEIGHT(FT) -->10.,0.,0.
 VECTOR RHOV12 -->       10.000      0.000      0.000

 INPUT <OWN> POSITION RELATIVE TO RADAR (1)
   DISTANCE(NM), BEARING(DEG) AND ALTITUDE(FT) -->10.,60.,0.
 VECTOR RHOV10 -->        5.000      8.660      0.000

 INPUT <TARGET> POSITION RELATIVE TO <OWN>
   DISTANCE(NM) AND ALTITUDE(FT) -->5.,0.
   BETA START, INCREMENT (DEG) -->0,5

 BETA      RANGE        BEARING       CEP
  0     100.0000      0.7832     427.1363
  5     100.0000      0.8016     436.6211
 10     100.0000      0.8236     448.0324
 15     100.0000      0.8491     461.1891
 20     100.0000      0.8776     475.9401
 25     100.0000      0.9088     492.1246
 30     100.0000      0.9422     509.5237
 35     100.0000      0.9774     527.7974
 40     100.0000      1.0131     546.3959
 45     100.0000      1.0477     564.4379
 50     100.0000      1.0785     580.5489
 55     100.0000      1.1017     592.6740
 60     100.0000*****************************
 65     100.0000      1.1017     592.6641
 70     100.0000      1.0644     573.1681
 75     100.0000      0.9963     537.6454
 80     100.0000      0.9049     490.1298
 85     100.0000      0.8181     445.1550
 90     100.0000      0.7807     425.8426
 95     100.0000      0.8181     445.1550
100     100.0000      0.9049     490.1298
105     100.0000      0.9963     537.6454
110     100.0000      1.0644     573.1681
115     100.0000      1.1017     592.6641
120     100.0000*****************************
125     100.0000      1.1017     592.6740
130     100.0000      1.0785     580.5489
135     100.0000      1.0477     564.4379
140     100.0000      1.0131     546.3959
145     100.0000      0.9774     527.7974
150     100.0000      0.9422     509.5237
155     100.0000      0.9088     492.1246
160     100.0000      0.8776     475.9401
165     100.0000      0.8491     461.1891
170     100.0000      0.8236     448.0324
175     100.0000      0.8016     436.6211
180     100.0000      0.7832     427.1363
185     100.0000      0.7690     419.8254
190     100.0000      0.7597     415.0378
195     100.0000      0.7562     413.2576
200     100.0000      0.7598     415.1250
205     100.0000      0.7721     421.4208
210     100.0000      0.7945     432.9659
215     100.0000      0.8281     450.3582
220     100.0000      0.8728     473.4616
225     100.0000      0.9251     500.6356
230     100.0000      0.9777     527.9574
235     100.0000      1.0183     549.1354
240     100.0000*****************************
245     100.0000      1.0141     546.9473
250     100.0000      0.9615     519.5339
255     100.0000      0.8880     481.3797
260     100.0000      0.8132     442.6322
265     100.0000      0.7574     413.8679
270     100.0000      0.7367     403.2362
275     100.0000      0.7574     413.8679
280     100.0000      0.8132     442.6322
285     100.0000      0.8880     481.3797
290     100.0000      0.9615     519.5339
295     100.0000      1.0141     546.9473
300     100.0000*****************************
305     100.0000      1.0183     549.1354
310     100.0000      0.9777     527.9574
315     100.0000      0.9251     500.6356
320     100.0000      0.8728     473.4616
325     100.0000      0.8281     450.3582
330     100.0000      0.7945     432.9659
335     100.0000      0.7721     421.4208
340     100.0000      0.7598     415.1250
345     100.0000      0.7562     413.2576
350     100.0000      0.7597     415.0378
355     100.0000      0.7690     419.8254
360     100.0000      0.7832     427.1363
TT0  --  STOP  --END OF BCAS PROGRAM--
>
```


SEMI-ACTIVE
DUAL #26
with Directional Ant.
with 1° error
ATCRBS, 20,8 equivale
TO -- STOP
SIGMA [RHO] (FT)
4000
3500
3000
2500
2000
1500
1000
500
0
30
60
90
120
150
180
210
240
270
300
330
360
RELATIVE BEARING (DEG)

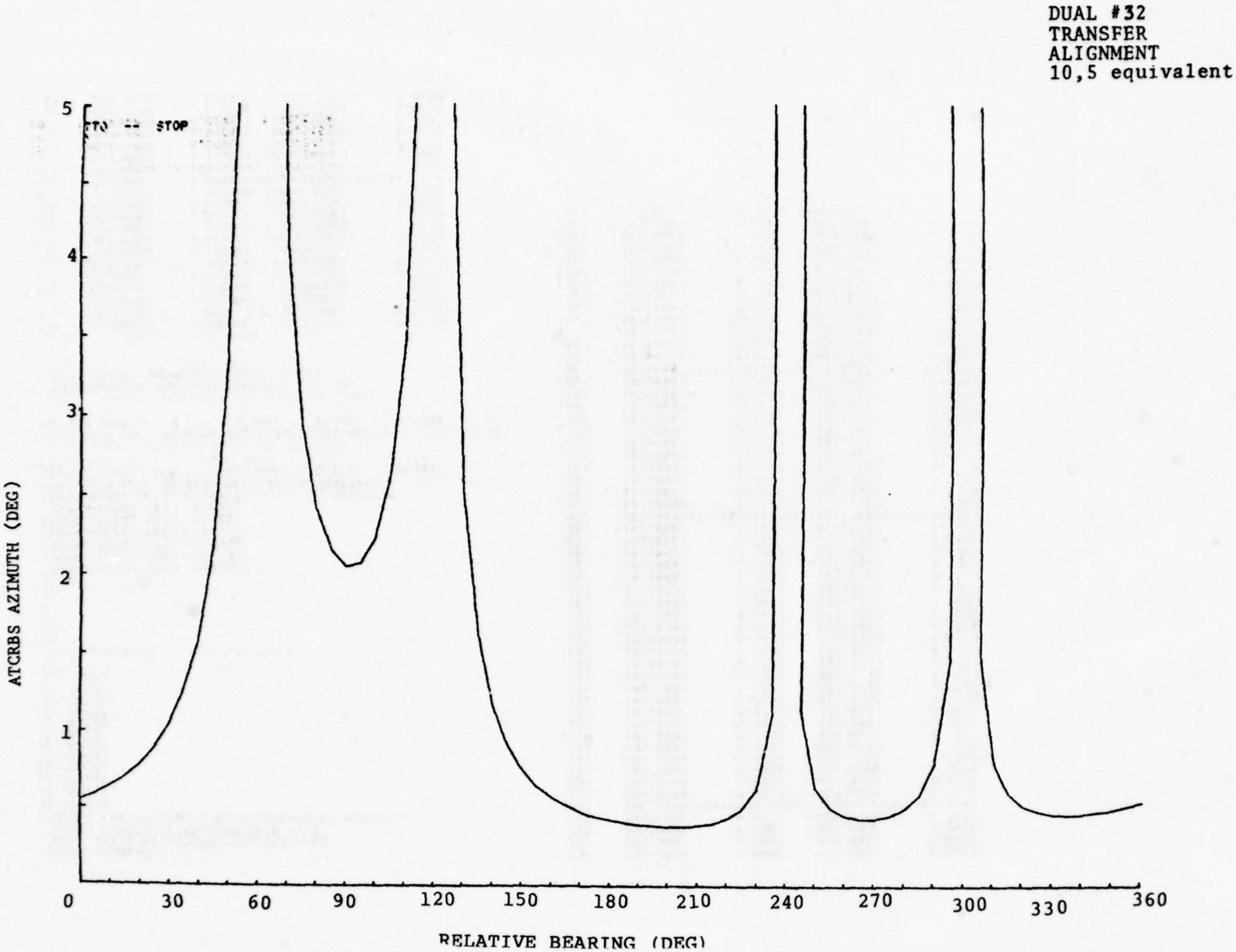
```
:RUN DK1:DUALP
 WANT DEBUG PRINTOUTS (Y=1/N=2)-->2
 ENTER NUMBER OF MEASUREMENTS -->7
CHOOSE THE FOLLOWING MEASUREMENTS BY NUMBER::
1..RHO1O
2..RHO1T
3..ALF1O
4..ALFD1
5..DTOA1
6..RHO2O
7..RHO2T
8..ALF2O
9..ALFD2
10..DTOA2
11..RHOOT
12..BETA

 ENTER NUMBERS -->3,4,5,8,9,10,11
 3
 4
 5
 8
 9
 10
 11
 SIGMA ALF1O (DEG) -->1.
 SIGMA ALFD1 (DEG) -->.25
 SIGMA DTOA1 (FT) -->100.
 SIGMA ALF2O (DEG) -->1.
 SIGMA ALFD2 (DEG) -->.25
 SIGMA DTOA2 (FT) -->100.
 SIGMA RHOOT (FT) -->100.
INPUT RADAR(2) POSITION RELATIVE TO RADAR(1)
 DISTANCE(NM), BEARING(DEG) AND HEIGHT(FT) -->20.,0.,0.
VECTOR RHOV12 -->       20.000     0.000     0.000

INPUT (OWN) POSITION RELATIVE TO RADAR (1)
 DISTANCE(NM), BEARING(DEG) AND ALTITUDE(FT) -->20.,60.,0.
VECTOR RHOV1O -->       10.000    17.321     0.000

INPUT (TARGET) POSITION RELATIVE TO (OWN)
 DISTANCE(NM) AND ALTITUDE(FT) -->8.,0.
 BETA START, INCREMENT (DEG) -->0,5

BETA      RANGE      BEARING      CEP
  0     100.0000     0.7459     640.6557
  5     100.0000     0.7611     653.4241
 10     100.0000     0.7806     669.7196
 15     100.0000     0.8037     689.1084
 20     100.0000     0.8300     711.2254
 25     100.0000     0.8591     735.7129
 30     100.0000     0.8906     762.1445
 35     100.0000     0.9236     789.9239
 40     100.0000     0.9571     818.1486
 45     100.0000     0.9895     845.4232
 50     100.0000     1.0182     869.6193
 55     100.0000     1.0396     887.6012
 60     100.0000**************************
 65     100.0000     1.0382     886.4568
 70     100.0000     1.0026     856.4830
 75     100.0000     0.9387     802.6574
 80     100.0000     0.8539     731.2714
 85     100.0000     0.7738     664.0925
 90     100.0000     0.7395     635.3369
 95     100.0000     0.7738     664.0925
100     100.0000     0.8539     731.2714
105     100.0000     0.9387     802.6574
110     100.0000     1.0026     856.4830
115     100.0000     1.0382     886.4568
120     100.0000**************************
125     100.0000     1.0396     887.6012
130     100.0000     1.0182     869.6193
135     100.0000     0.9895     845.4232
140     100.0000     0.9571     818.1486
145     100.0000     0.9236     789.9239
150     100.0000     0.8906     762.1445
155     100.0000     0.8591     735.7129
160     100.0000     0.8300     711.2254
165     100.0000     0.8037     689.1084
170     100.0000     0.7806     669.7196
175     100.0000     0.7611     653.4241
180     100.0000     0.7459     640.6557
185     100.0000     0.7355     631.9636
190     100.0000     0.7308     628.0446
195     100.0000     0.7329     629.7454
200     100.0000     0.7427     638.0140
205     100.0000     0.7615     653.7621
210     100.0000     0.7899     677.6000
215     100.0000     0.8278     709.4117
220     100.0000     0.8735     747.7834
225     100.0000     0.9230     789.3936
230     100.0000     0.9696     828.6308
235     100.0000     1.0043     857.8814
240     100.0000**************************
245     100.0000     1.0016     855.6142
250     100.0000     0.9554     816.6911
255     100.0000     0.8858     758.1178
260     100.0000     0.8087     693.3644
265     100.0000     0.7469     641.5186
270     100.0000     0.7230     621.4522
275     100.0000     0.7469     641.5186
280     100.0000     0.8087     693.3644
285     100.0000     0.8858     758.1178
290     100.0000     0.9554     816.6911
295     100.0000     1.0016     855.6142
300     100.0000**************************
305     100.0000     1.0043     857.8814
310     100.0000     0.9696     828.6308
315     100.0000     0.9230     789.3936
320     100.0000     0.8735     747.7834
325     100.0000     0.8278     709.4117
330     100.0000     0.7899     677.6000
335     100.0000     0.7615     653.7621
340     100.0000     0.7427     638.0140
345     100.0000     0.7329     629.7454
350     100.0000     0.7308     628.0446
355     100.0000     0.7355     631.9636
360     100.0000     0.7459     640.6557
TTO  --  STOP  --END OF BCAS PROGRAM--
>
```


SEMI-ACTIVE DUAL #26
With Directional Antenna
with 1° error
ATCRBS
50,10 equivalent
TTO -- STOP
SIGMA [RHO] (FT)
4000
3500
3000
2500
2000
1500
1000
500
0
30
60
90
120
150
180
210
240
270
300
330
360
RELATIVE BEARING (DEG)

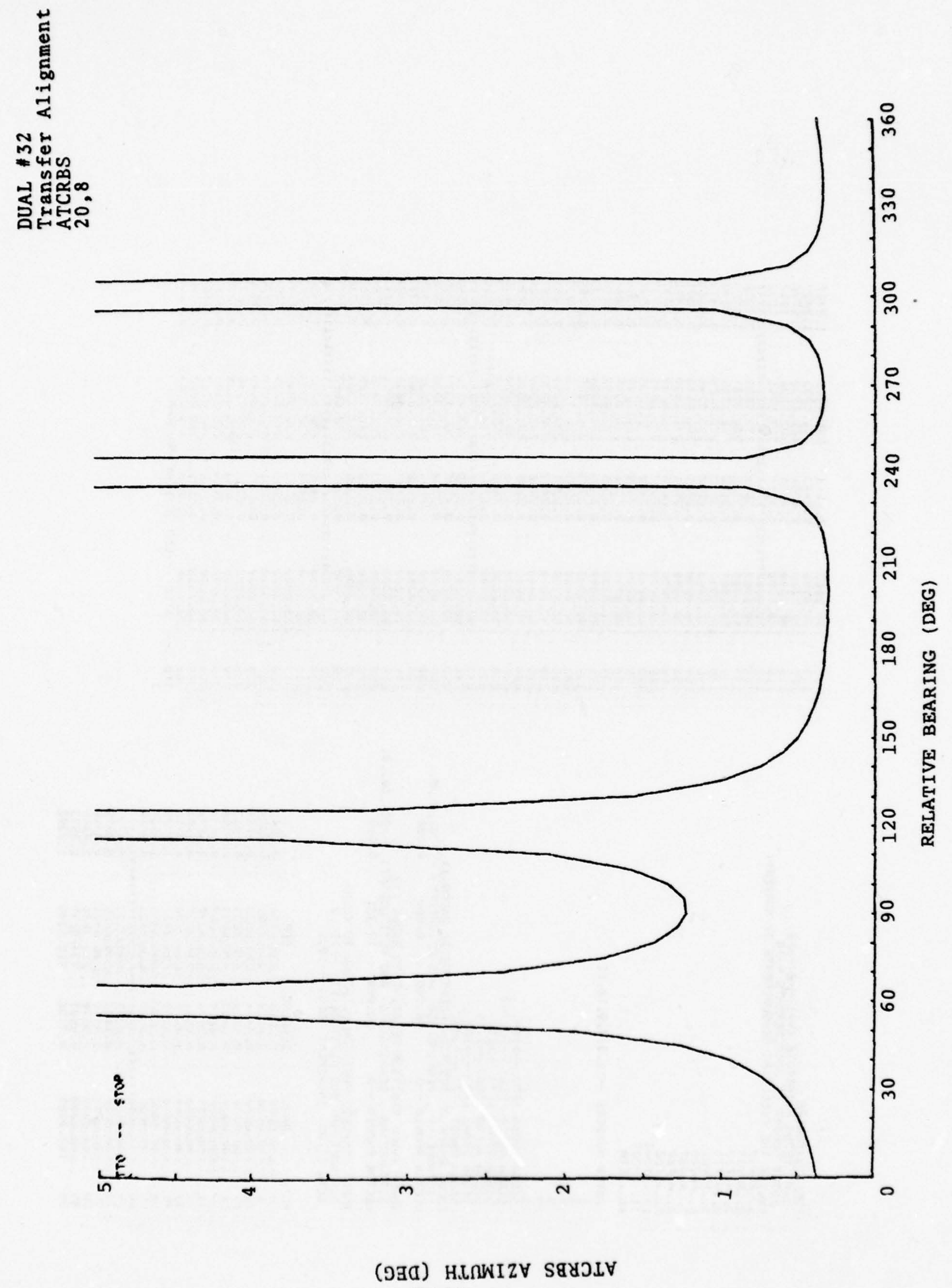
```
*RUN INDIVIDUALP
 WANT DEBUG PRINTOUTS (Y=1,N=2)-->2
 ENTER NUMBER OF MEASUREMENTS -->7
CHOOSE THE FOLLOWING MEASUREMENTS BY NUMBER!!
1..RHO10
2..RHO1T
3..ALF10
4..ALFD1
5..DTOA1
6..RHO20
7..RHO2T
8..ALF20
9..ALFD2
10..DTOA2
11..RHOOT
12..BETA

 ENTER NUMBERS -->3,4,5,8,9,10,11
3
4
5
8
9
10
11
 SIGMA ALF10 (DEG) -->1.
 SIGMA ALFD1 (DEG) -->.25
 SIGMA DTOA1 (FT) -->100.
 SIGMA ALF20 (DEG) -->.\.\1.
 SIGMA ALFD2 (DEG) -->.25
 SIGMA DTOA2 (FT) -->100.
 SIGMA RHOOT (FT) -->100.
INPUT RADAR(2) POSITION RELATIVE TO RADAR(1)
 DISTANCE(NM), BEARING(DEG) AND HEIGHT(FT) -->50.,0.,0.
VECTOR RHOV12 -->        50.000      0.000      0.000

INPUT (OWN) POSITION RELATIVE TO RADAR (1)
 DISTANCE(NM), BEARING(DEG) AND ALTITUDE(FT) -->50.,60.,0.
VECTOR RHOV10 -->        25.000     43.301      0.000

INPUT (TARGET) POSITION RELATIVE TO (OWN)
 DISTANCE(NM) AND ALTITUDE(FT) -->10.,0.
 BETA START, INCREMENT (DEG) -->0,5

BETA       RANGE         BEARING        CEP
  0     100.0000         0.7290     779.5545
  5     100.0000         0.7397     790.8046
 10     100.0000         0.7562     808.1613
 15     100.0000         0.7778     830.9087
 20     100.0000         0.8039     858.3364
 25     100.0000         0.8336     889.7085
 30     100.0000         0.8664     924.1927
 35     100.0000         0.9010     960.7460
 40     100.0000         0.9363     997.9470
 45     100.0000         0.9702    1033.7683
 50     100.0000         1.0001    1065.2901
 55     100.0000         1.0220    1088.3962
 60     100.0000**************************
 65     100.0000         1.0200    1086.2826
 70     100.0000         0.9839    1048.2396
 75     100.0000         0.9205     981.2663
 80     100.0000         0.8376     893.9080
 85     100.0000         0.7606     818.8151
 90     100.0000         0.7279     778.3933
 95     100.0000         0.7606     818.8151
100     100.0000         0.8376     893.9080
105     100.0000         0.9205     981.2663
110     100.0000         0.9839    1048.2396
115     100.0000         1.0200    1086.2826
120     100.0000**************************
125     100.0000         1.0220    1088.3962
130     100.0000         1.0001    1065.2901
135     100.0000         0.9702    1033.7683
140     100.0000         0.9363     997.9470
145     100.0000         0.9010     960.7460
150     100.0000         0.8664     924.1927
155     100.0000         0.8336     889.7085
160     100.0000         0.8039     858.3364
165     100.0000         0.7778     830.9087
170     100.0000         0.7562     808.1613
175     100.0000         0.7397     790.8046
180     100.0000         0.7290     779.5545
185     100.0000         0.7248     775.1239
190     100.0000         0.7277     778.1748
195     100.0000         0.7382     789.2312
200     100.0000         0.7566     808.5591
205     100.0000         0.7827     836.0201
210     100.0000         0.8158     870.9050
215     100.0000         0.8546     911.7539
220     100.0000         0.8967     956.1623
225     100.0000         0.9388    1000.5921
230     100.0000         0.9764    1040.2359
235     100.0000         1.0037    1069.0490
240     100.0000**************************
245     100.0000         1.0017    1066.9557
250     100.0000         0.9622    1025.2654
255     100.0000         0.8973     956.8279
260     100.0000         0.8185     873.7659
265     100.0000         0.7498     801.4605
270     100.0000         0.7218     771.9884
275     100.0000         0.7498     801.4605
280     100.0000         0.8185     873.7659
285     100.0000         0.8973     956.8279
290     100.0000         0.9622    1025.2654
295     100.0000         1.0017    1066.9557
300     100.0000**************************
305     100.0000         1.0037    1069.0490
310     100.0000         0.9764    1040.2359
315     100.0000         0.9388    1000.5921
320     100.0000         0.8967     956.1623
325     100.0000         0.8546     911.7539
330     100.0000         0.8158     870.9050
335     100.0000         0.7827     836.0201
340     100.0000         0.7566     808.5591
345     100.0000         0.7382     789.2312
350     100.0000         0.7277     778.1748
355     100.0000         0.7248     775.1239
360     100.0000         0.7290     779.5545
TT0  --  STOP  --END OF BCAS PROGRAM--
>
```


SEMI-ACTIVE
DUAL #26 with directional ant.
ATCRBS
1° error Ant.
100,20 equivalent
TO -- STOP
SIGMA [RHO] (FT)
4000
3500
3000
2500
2000
1500
1000
500
0
30
60
90
120
150
180
210
240
270
300
330
360
RELATIVE BEARING (DEG)

```
:RUN DK1:DUALP
  WANT DEBUG PRINTOUTS (Y=1/N=2)-->2
  ENTEP NUMBER OF MEASUREMENTS -->7
 CHOOSE THE FOLLOWING MEASUREMENTS BY NUMBER!!
 1..RHO10
 2..RHO1T
 3..ALF10
 4..ALFD1
 5..DTCA1
 6..RHO20
 7..RHO2T
 8..ALF20
 9..ALFD2
 10..DTCA2
 11..RHOOT
 12..BETA

  ENTER NUMBERS -->3,4,5,8,9,10,11
  3
  4
  5
  8
  9
  10
  11
   SIGMA ALF10 (DEG) -->1.
   SIGMA ALFD1 (DEG) -->.25
   SIGMA DTCA1 (FT) -->100.
   SIGMA ALF20 (DEG) -->1.
   SIGMA ALFD2 (DEG) -->.25
   SIGMA DTCA2 (FT) -->100.
   SIGMA RHOOT (FT) -->100.
 INPUT RADAR(2) POSITION RELATIVE TO RADAR(1)
  DISTANCE(NM), BEARING(DEG) AND HEIGHT(FT) -->100.,0.,0.
 VECTOR RHO12 -->      100.000      0.000      0.000

 INPUT (OWN) POSITION RELATIVE TO RADAR (1)
  DISTANCE(NM), BEARING(DEG) AND ALTITUDE(FT) -->100.,60.,0.
 VECTOR RHO10 -->       50.000     86.603      0.000

 INPUT (TARGET) POSITION RELATIVE TO (OWN)
  DISTANCE(NM) AND ALTITUDE(FT) -->20.,0.
  BETA START, INCREMENT (DEG) -->0,5

 BETA       RANGE        BEARING       CEP
  0      100.0000        0.7193     1528.8986
  5      100.0000        0.7294     1550.2993
 10      100.0000        0.7453     1583.9534
 15      100.0000        0.7663     1628.4059
 20      100.0000        0.7917     1682.2139
 25      100.0000        0.8209     1743.8891
 30      100.0000        0.8529     1811.7606
 35      100.0000        0.8862     1883.7483
 40      100.0000        0.9215     1957.0339
 45      100.0000        0.9548     2027.6114
 50      100.0000        0.9841     2089.7231
 55      100.0000        1.0056     2135.2586
 60      100.0000*****************************
 65      100.0000        1.0037     2131.1494
 70      100.0000        0.9683     2056.2400
 75      100.0000        0.9061     1924.3151
 80      100.0000        0.8248     1758.1594
 85      100.0000        0.7492     1592.8606
 90      100.0000        0.7172     1524.3554
 95      100.0000        0.7492     1592.2606
100      100.0000        0.8248     1758.1594
105      100.0000        0.9061     1924.3151
110      100.0000        0.9683     2056.2400
115      100.0000        1.0037     2131.1494
120      100.0000*****************************
125      100.0000        1.0056     2135.2586
130      100.0000        0.9841     2089.7231
135      100.0000        0.9548     2027.6114
140      100.0000        0.9215     1957.0339
145      100.0000        0.8869     1883.7483
150      100.0000        0.8529     1811.7606
155      100.0000        0.8209     1743.8891
160      100.0000        0.7917     1682.2139
165      100.0000        0.7663     1628.4059
170      100.0000        0.7453     1583.9534
175      100.0000        0.7294     1550.2993
180      100.0000        0.7193     1528.8986
185      100.0000        0.7157     1521.1972
190      100.0000        0.7191     1528.5293
195      100.0000        0.7302     1551.9395
200      100.0000        0.7491     1591.9393
205      100.0000        0.7757     1648.2155
210      100.0000        0.8093     1719.3029
215      100.0000        0.8484     1802.2295
220      100.0000        0.8909     1892.1358
225      100.0000        0.9332     1981.8985
230      100.0000        0.9710     2061.8578
235      100.0000        0.9984     2119.8781
240      100.0000*****************************
245      100.0000        0.9963     2115.4038
250      100.0000        0.9565     2031.1702
255      100.0000        0.8912     1892.8434
260      100.0000        0.8118     1724.7045
265      100.0000        0.7425     1578.0158
270      100.0000        0.7142     1518.1135
275      100.0000        0.7426     1578.0158
280      100.0000        0.8118     1724.7045
285      100.0000        0.8912     1892.8434
290      100.0000        0.9565     2031.1702
295      100.0000        0.9963     2115.4038
300      100.0000*****************************
305      100.0000        0.9984     2119.8781
310      100.0000        0.9710     2061.8578
315      100.0000        0.9332     1981.8985
320      100.0000        0.8909     1892.1358
325      100.0000        0.8484     1802.2295
330      100.0000        0.8093     1719.3029
335      100.0000        0.7757     1648.2155
340      100.0000        0.7491     1591.9393
345      100.0000        0.7302     1551.9395
350      100.0000        0.7191     1528.5293
355      100.0000        0.7157     1521.1972
360      100.0000        0.7193     1528.8986
TT0  --  STOP  --END OF BCAS PROGRAM--
>
```

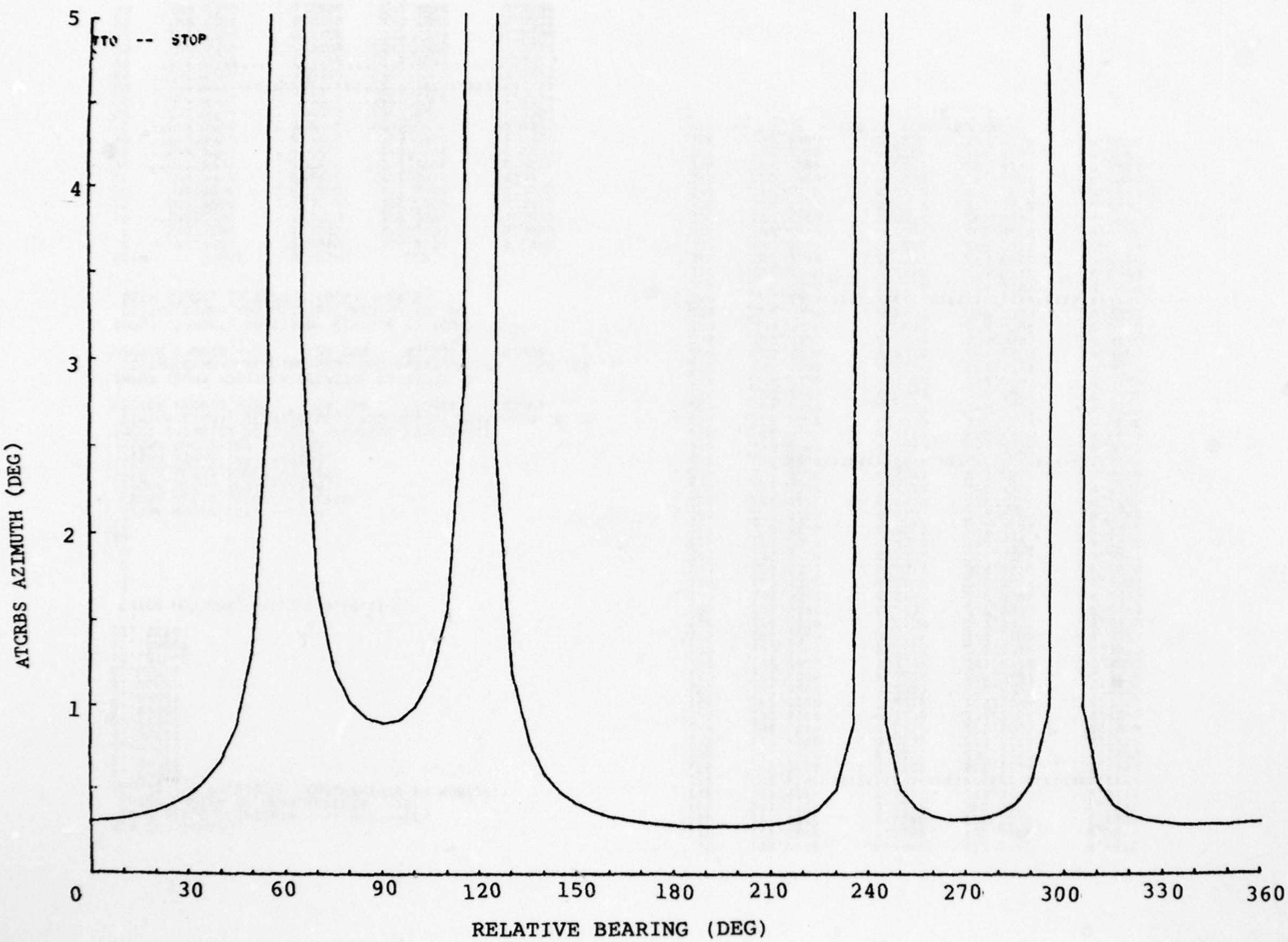

DUAL #32
TRANSFER
ALIGNMENT
10,5 equivalent
ATCRBS AZIMUTH (DEG)
RELATIVE BEARING (DEG)
0
30
60
90
120
150
180
210
240
270
300
330
360
1
2
3
4
5

```
-UN DK1:DUALP2
  WANT DEBUG PRINTOUTS (Y=1/N=2)-->2
  ENTER NUMBER OF MEASUREMENTS -->6
CHOOSE THE FOLLOWING MEASUREMENTS BY NUMBER::
1..RHO10
2..RHO1T
3..ALF10
4..ALFD1
5..DTOA1
6..RHO20
7..RHO2T
8..ALF20
9..ALFD2
10..DTOA2
11..RHOOT
12..BETA

 ENTER NUMBERS -->1,3,5,9,10,11
 1
 3
 5
 9
 10
 11
 SIGMA RHO10 (FT) -->100.
 SIGMA ALF10 (DEG) -->.1768
 SIGMA DTOA1 (FT) -->100.
 SIGMA ALFD2 (DEG) -->.25
 SIGMA DTOA2 (FT) -->100.
 SIGMA RHOOT (FT) -->100.
INPUT RADAR(2) POSITION RELATIVE TO RADAR(1)
 DISTANCE(NM), BEARING(DEG) AND HEIGHT(FT) -->10.,0.,0.
VECTOR RHOV12 -->       10.000      0.000      0.000

INPUT (OWN) POSITION RELATIVE TO RADAR (1)
 DISTANCE(NM), BEARING(DEG) AND ALTITUDE(FT) -->10.,60.,0.
VECTOR RHOV10 -->        5.000      8.660      0.000

INPUT (TARGET) POSITION RELATIVE TO (OWN)
 DISTANCE(NM) AND ALTITUDE(FT) -->5.,0.
 BETA START, INCREMENT (DEG) -->0,5

BETA      RANGE      BEARING      CEP
 0      100.0000     0.6086     337.8401      0.5466
 5      100.0000     0.6630     365.4992      0.5846
 10     100.0000     0.7284     398.9832      0.6331
 15     100.0000     0.8085     440.2319      0.6956
 20     100.0000     0.9088     492.1563      0.7772
 25     100.0000     1.0379     559.3314      0.8863
 30     100.0000     1.2101     649.3828      1.0371
 35     100.0000     1.4514     776.0374      1.2552
 40     100.0000     1.8134     966.7489      1.5919
 45     100.0000     2.4172    1285.5761      2.1678
 50     100.0000     3.6249    1924.6953      3.3445
 55     100.0000     7.2489    3844.9862      6.9336
 60     100.0000**********************************
 65     100.0000     7.2489    3844.9862      7.6500
 70     100.0000     3.6249    1924.6953      4.0801
 75     100.0000     2.4172    1285.5761      2.9376
 80     100.0000     1.8134     966.7489      2.4144
 85     100.0000     1.4514     776.0374      2.1551
 90     100.0000     1.2101     649.3828      2.0503
 95     100.0000     1.0379     559.3314      2.0688
100     100.0000     0.9088     492.1563      2.2262
105     100.0000     0.8085     440.2319      2.6046
110     100.0000     0.7284     398.9832      3.4855
115     100.0000     0.6630     365.4992      6.3131
120     100.0000**********************************
125     100.0000     0.5627     314.6638      5.4006
130     100.0000     0.5234     295.0129      2.6492
135     100.0000     0.4896     278.1868      1.6259
140     100.0000     0.4601     263.6620      1.1819
145     100.0000     0.4343     251.0407      0.9278
150     100.0000     0.4115     240.0169      0.7674
155     100.0000     0.3914     230.3531      0.6595
160     100.0000     0.3735     221.8657      0.5838
165     100.0000     0.3577     214.4139      0.5290
170     100.0000     0.3437     207.8935      0.4885
175     100.0000     0.3315     202.2349      0.4581
180     100.0000     0.3210     197.4029      0.4351
185     100.0000     0.3122     193.4028      0.4179
190     100.0000     0.3053     190.2923      0.4054
195     100.0000     0.3007     188.2057      0.3970
200     100.0000     0.2989     187.3997      0.3925
205     100.0000     0.3010     188.3447      0.3923
210     100.0000     0.3089     191.9154      0.3977
215     100.0000     0.3263     199.8282      0.4113
220     100.0000     0.3606     215.7655      0.4395
225     100.0000     0.4297     248.8070      0.4986
230     100.0000     0.5875     327.1926      0.6405
235     100.0000     1.1045     594.1329      1.1342
240     100.0000**********************************
245     100.0000     1.1046     594.1329      1.1358
250     100.0000     0.5875     327.1926      0.6465
255     100.0000     0.4297     248.8070      0.5108
260     100.0000     0.3606     215.7655      0.4599
265     100.0000     0.3263     199.8282      0.4427
270     100.0000     0.3089     191.9154      0.4449
275     100.0000     0.3010     188.3447      0.4647
280     100.0000     0.2989     187.3997      0.5085
285     100.0000     0.3007     188.2057      0.5979
290     100.0000     0.3053     190.2923      0.8032
295     100.0000     0.3122     193.4028      1.4641
300     100.0000**********************************
305     100.0000     0.3315     202.2349      1.4855
310     100.0000     0.3437     207.8935      0.8084
315     100.0000     0.3577     214.4139      0.6081
320     100.0000     0.3735     221.8657      0.5242
325     100.0000     0.3914     230.3531      0.4851
330     100.0000     0.4115     240.0169      0.4676
335     100.0000     0.4343     251.0407      0.4632
340     100.0000     0.4601     263.6620      0.4671
345     100.0000     0.4896     278.1868      0.4776
350     100.0000     0.5234     295.0129      0.4942
355     100.0000     0.5627     314.6638      0.5169
360     100.0000     0.6086     337.8401      0.5466
TT0  --  STOP  --END OF BCAS PROGRAM--
>
```

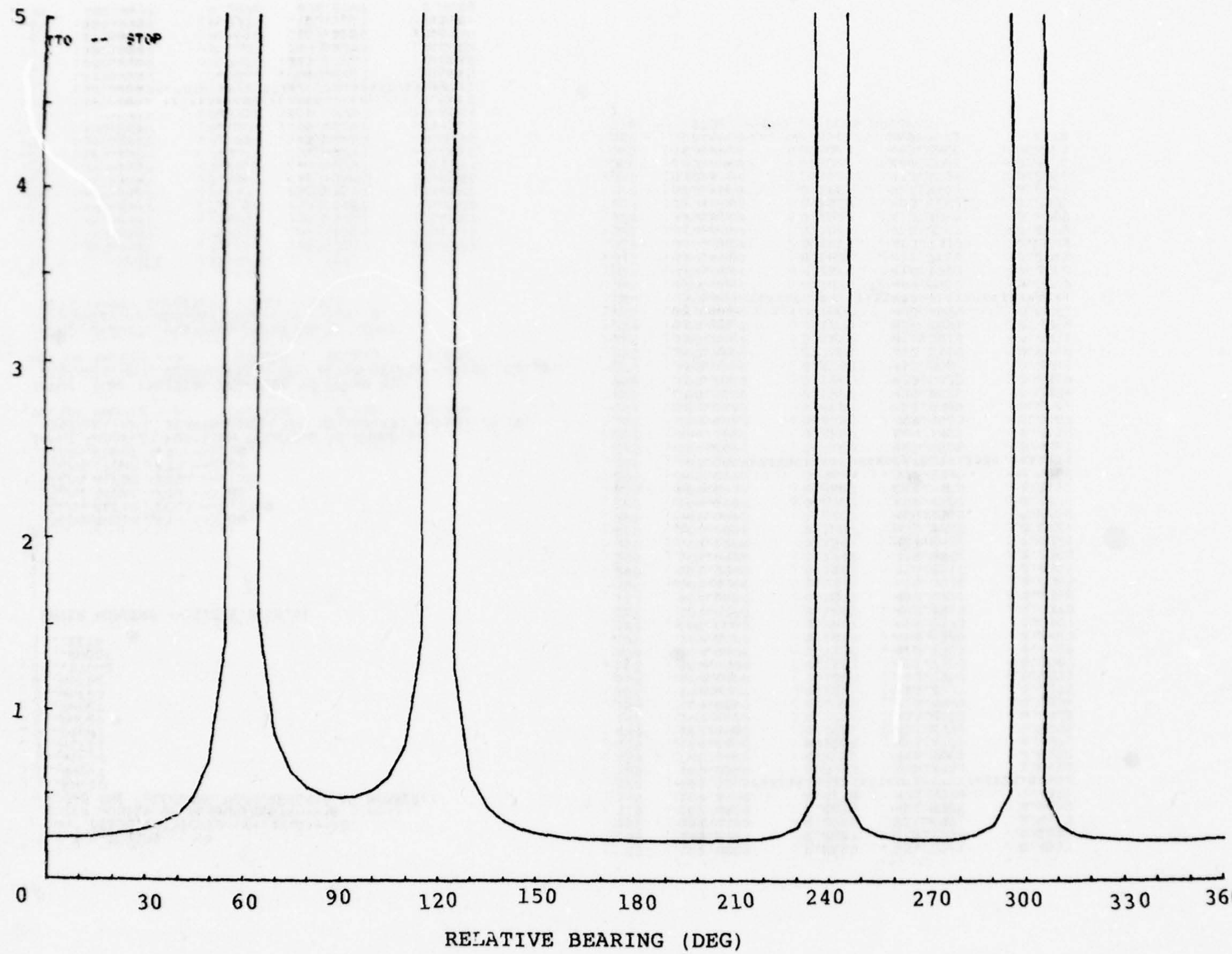

DUAL #32
Transfer Alignment
ATCRBS
20,8
TTO -- STOP
0
1
2
3
4
5
ATCRBS AZIMUTH (DEG)
0
30
60
90
120
150
180
210
240
270
300
330
360
RELATIVE BEARING (DEG)

```
RUN DK1:DUALP2
 WANT DEBUG PRINTOUTS (Y=1/N=2)-->2
 ENTER NUMBER OF MEASUREMENTS -->6
CHOOSE THE FOLLOWING MEASUREMENTS BY NUMBER!!
1..RHO1O
2..RHO1T
3..ALF1O
4..ALFD1
5..DTOA1
6..RHO2O
7..RHO3T
8..ALF2O
9..ALFD2
10..DTOA2
11..RHOOT
12..BETA

 ENTER NUMBERS -->1,3,5,9,10,11
 1
 3
 5
 9
10
11
 SIGMA RHO10 (FT) -->100.
 SIGMA ALF10 (DEG) -->.1768
 SIGMA DTOA1 (FT) -->100.
 SIGMA ALFD2 (DEG) -->.25
 SIGMA DTOA2 (FT) -->100.
 SIGMA RHOOT (FT) -->100.
INPUT RADAR<2> POSITION RELATIVE TO RADAR<1>
 DISTANCE(NM), BEARING(DEG) AND HEIGHT(FT) -->20.,0.,0.
VECTOR RHOV12 -->        20.000      0.000      0.000

INPUT <OWN> POSITION RELATIVE TO RADAR <1>
 DISTANCE(NM), BEARING(DEG) AND ALTITUDE(FT) -->20.,60.,0.
VECTOR RHOV10 -->        10.000     17.321      0.000

INPUT <TARGET> POSITION RELATIVE TO <OWN>
 DISTANCE(NM) AND ALTITUDE(FT) -->8.,0.
 BETA START. INCREMENT (DEG) -->0,5

BETA     RANGE      BEARING      CEP
  0    100.0000     0.3818    338.9784      0.3641
  5    100.0000     0.4114    363.0761      0.3834
 10    100.0000     0.4474    392.5538      0.4084
 15    100.0000     0.4920    429.2233      0.4413
 20    100.0000     0.5483    475.8033      0.4860
 25    100.0000     0.6214    536.5668      0.5444
 30    100.0000     0.7196    618.6348      0.6878
 35    100.0000     0.8581    734.8237      0.7602
 40    100.0000     1.0670    910.7680      0.9418
 45    100.0000     1.4169   1206.2461      1.2722
 50    100.0000     2.1192   1800.6455      1.9534
 55    100.0000     4.2309   3590.7893      4.0418
 60    100.0000********************************************
 65    100.0000     4.2309   3590.7893      4.4754
 70    100.0000     2.1192   1800.6455      2.3976
 75    100.0000     1.4169   1206.2461      1.7355
 80    100.0000     1.0670    910.7626      1.4345
 85    100.0000     0.8581    734.8237      1.2873
 90    100.0000     0.7196    618.6348      1.2302
 95    100.0000     0.6214    536.5668      1.2457
100    100.0000     0.5483    475.8033      1.3437
105    100.0000     0.4920    429.2233      1.5745
110    100.0000     0.4474    392.5538      2.1092
115    100.0000     0.4114    363.0761      3.8256
120    100.0000********************************************
125    100.0000     0.3571    319.0082      3.2986
130    100.0000     0.3362    302.2727      1.5703
135    100.0000     0.3185    288.1195      1.0142
140    100.0000     0.3033    276.0628      0.7494
145    100.0000     0.2902    265.7346      0.5999
150    100.0000     0.2789    256.8540      0.5071
155    100.0000     0.2691    249.2050      0.4458
160    100.0000     0.2606    242.6229      0.4037
165    100.0000     0.2532    236.9845      0.3737
170    100.0000     0.2470    232.2033      0.3520
175    100.0000     0.2418    228.2267      0.3359
180    100.0000     0.2376    225.0385      0.3241
185    100.0000     0.2345    222.6652      0.3154
190    100.0000     0.2326    221.1904      0.3093
195    100.0000     0.2320    220.7825      0.3055
200    100.0000     0.2333    221.7476      0.3039
205    100.0000     0.2371    224.6356      0.3051
210    100.0000     0.2447    230.4632      0.3097
215    100.0000     0.2588    241.2309      0.3200
220    100.0000     0.2845    261.2636      0.3406
225    100.0000     0.3350    301.3220      0.3836
230    100.0000     0.4506    395.1377      0.4877
235    100.0000     0.8339    714.4831      0.8545
240    100.0000********************************************
245    100.0000     0.8339    714.4831      0.8550
250    100.0000     0.4506    395.1377      0.4895
255    100.0000     0.3350    301.3220      0.3678
260    100.0000     0.2845    261.2636      0.3485
265    100.0000     0.2588    241.2309      0.3337
270    100.0000     0.2447    230.4632      0.3329
275    100.0000     0.2371    224.6356      0.3443
280    100.0000     0.2333    221.7476      0.3724
285    100.0000     0.2320    220.7825      0.4322
290    100.0000     0.2326    221.1904      0.5730
295    100.0000     0.2345    222.6652      1.0477
300    100.0000********************************************
305    100.0000     0.2418    228.2267      1.0450
310    100.0000     0.2470    232.2033      0.5743
315    100.0000     0.2532    236.9845      0.4345
320    100.0000     0.2606    242.6229      0.3754
325    100.0000     0.2691    249.2050      0.3470
330    100.0000     0.2789    256.3540      0.3332
335    100.0000     0.2902    265.7346      0.3277
340    100.0000     0.3033    276.0628      0.3275
345    100.0000     0.3185    288.1195      0.3317
350    100.0000     0.3362    302.2727      0.3387
355    100.0000     0.3571    319.0082      0.3495
360    100.0000     0.3818    338.9784      0.3641
TTO  --  STOP  --END OF BCHS PROGRAM--
>
```

DUAL #32
Transfer Alignment
50,10



```
RUN DK1:DUALP2
 WANT DEBUG PRINTOUTS (Y=1/N=2)-->2
 ENTER NUMBER OF MEASUREMENTS -->6
CHOOSE THE FOLLOWING MEASUREMENTS BY NUMBER::
1..RHO10
2..RHO1T
3..ALF10
4..ALFD1
5..DTOA1
6..RHO20
7..RHO2T
8..ALF20
9..ALFD2
10..DTOA2
11..RHOOT
12..BETA

 ENTER NUMBERS -->1,3,5,9,10,11
 1
 3
 5
 9
10
11
 SIGMA RHO10 (FT) -->100.
 SIGMA ALF10 (DEG) -->.1768
 SIGMA DTOA1 (FT) -->100.
 SIGMA ALFD2 (DEG) -->.25
 SIGMA DTOA2 (FT) -->100.
 SIGMA RHOOT (FT) -->100.
INPUT RADAR(2) POSITION RELATIVE TO RADAR(1)
 DISTANCE(NM), BEARING(DEG) AND HEIGHT(FT) -->50.,0.,0.
VECTOR RHOV12 -->        50.000      0.000      0.000

INPUT (OWN) POSITION RELATIVE TO RADAR (1)
 DISTANCE(NM), BEARING(DEG) AND ALTITUDE(FT) -->50.,60.,0.
VECTOR PHOV10 -->        25.000     43.301      0.000

INPUT (TARGET) POSITION RELATIVE TO (OWN)
 DISTANCE(NM) AND ALTITUDE(FT) -->10.,0.
 BETA START, INCREMENT (DEG) -->0,5

BETA     RANGE        BEARING      CEP
  0    100.0000      0.2915     324.8730       0.2996
  5    100.0000      0.3097     343.3492       0.3095
 10    100.0000      0.3323     366.3075       0.3231
 15    100.0000      0.3606     395.2950       0.3418
 20    100.0000      0.3969     432.6388       0.3675
 25    100.0000      0.4446     482.0015       0.4035
 30    100.0000      0.5095     549.4905       0.4555
 35    100.0000      0.6012     646.0989       0.5337
 40    100.0000      0.7426     793.8067       0.6589
 45    100.0000      0.9798    1043.8826       0.8793
 50    100.0000      1.4586    1550.0941       1.3399
 55    100.0000      2.9039    3081.1752       2.7654
 60    100.0000**************************************
 65    100.0000      2.9039    3081.1752       3.0873
 70    100.0000      1.4586    1550.0941       1.6684
 75    100.0000      0.9798    1043.8826       1.2198
 80    100.0000      0.7426     793.8067       1.0188
 85    100.0000      0.6019     646.0989       0.9232
 90    100.0000      0.5095     549.4905       0.8900
 95    100.0000      0.4446     482.0015       0.9078
100    100.0000      0.3969     432.6388       0.9851
105    100.0000      0.3606     395.2950       1.1599
110    100.0000      0.3323     366.3075       1.5606
115    100.0000      0.3097     343.3492       2.8441
120    100.0000**************************************
125    100.0000      0.2765     309.8134       2.4889
130    100.0000      0.2641     297.4147       1.1989
135    100.0000      0.2538     287.1294       0.7869
140    100.0000      0.2452     278.5533       0.5910
145    100.0000      0.2379     271.3852       0.4822
150    100.0000      0.2318     265.3994       0.4156
155    100.0000      0.2267     260.4279       0.3722
160    100.0000      0.2226     256.3487       0.3428
165    100.0000      0.2192     253.0788       0.3223
170    100.0000      0.2166     250.5712       0.3077
175    100.0000      0.2148     248.8151       0.2973
180    100.0000      0.2138     247.8411       0.2899
185    100.0000      0.2137     247.7333       0.2849
190    100.0000      0.2147     248.6509       0.2819
195    100.0000      0.2170     250.8695       0.2809
200    100.0000      0.2210     254.8578       0.2819
205    100.0000      0.2278     261.4281       0.2857
210    100.0000      0.2386     272.0507       0.2932
215    100.0000      0.2563     289.5681       0.3069
220    100.0000      0.2867     320.0185       0.3322
225    100.0000      0.3439     378.1528       0.3825
230    100.0000      0.4710     509.4455       0.4999
235    100.0000      0.8844     943.2510       0.9002
240    100.0000**************************************
245    100.0000      0.8844     943.2510       0.9008
250    100.0000      0.4710     509.4455       0.5022
255    100.0000      0.3439     378.1528       0.3876
260    100.0000      0.2867     320.0185       0.3415
265    100.0000      0.2563     289.5681       0.3225
270    100.0000      0.2386     272.0507       0.3186
275    100.0000      0.2278     261.4281       0.3275
280    100.0000      0.2210     254.8578       0.3528
285    100.0000      0.2170     250.8695       0.4086
290    100.0000      0.2147     248.6509       0.5418
295    100.0000      0.2137     247.7333       0.9922
300    100.0000**************************************
305    100.0000      0.2148     248.8151       0.9917
310    100.0000      0.2166     250.5712       0.5403
315    100.0000      0.2192     253.0788       0.4052
320    100.0000      0.2226     256.3487       0.3464
325    100.0000      0.2267     260.4279       0.3165
330    100.0000      0.2318     265.3994       0.3002
335    100.0000      0.2379     271.3852       0.2915
340    100.0000      0.2452     278.5533       0.2874
345    100.0000      0.2538     287.1294       0.2866
350    100.0000      0.2641     297.4147       0.2884
355    100.0000      0.2765     309.8134       0.2927
360    100.0000      0.2915     324.8730       0.2996
TT0  --  STOP  --END OF BCAS PROGRAM--
>
```


Transfer Aligment
DUAL #32
ATCRBS
100,20 equivalent
TTO -- STOP
ATCRBS AZIMUTH (DEG)
RELATIVE BEARING (DEG)
0
1
2
3
4
5
30
60
90
120
150
180
210
240
270
300
330
360

```
RUN DK1:DUALP2
 WANT DEBUG PRINTOUTS (Y=1/N=2)-->2
 ENTER NUMBER OF MEASUREMENTS -->6
CHOOSE THE FOLLOWING MEASUREMENTS BY NUMBER::
1..RHO10
2..RHO1T
3..ALF10
4..ALFD1
5..DTOA1
6..RHO20
7..RHO2T
8..ALF20
9..ALFD2
10..DTOA2
11..RHOOT
12..BETA

 ENTER NUMBERS -->1,3,5,9,10,11
 1
 3
 5
 9
 10
 11
 SIGMA RHO10 (FT) -->100.
 SIGMA ALF10 (DEG) -->.1768
 SIGMA DTOA1 (FT) -->100.
 SIGMA ALFD2 (DEG) -->.25
 SIGMA DTOA2 (FT) -->100.
 SIGMA RHOOT (FT) -->100.
INPUT RADAR(2) POSITION RELATIVE TO RADAR(1)
 DISTANCE(NM), BEARING(DEG) AND HEIGHT(FT) -->100.,0.,0.
VECTOR RHOV12 -->     100.000     0.000     0.000

INPUT (OWN) POSITION RELATIVE TO RADAR (1)
 DISTANCE(NM), BEARING(DEG) AND ALTITUDE(FT) -->100.,60.,0.
VECTOR RHOV10 -->      50.000    86.603     0.000

INPUT (TARGET) POSITION RELATIVE TO (OWN)
 DISTANCE(NM) AND ALTITUDE(FT) -->20.,0.
 BETA START, INCREMENT (DEG) -->0,5

BETA      RANGE       BEARING      CEP
 0      100.0000     0.2114     459.3513      0.2379
 5      100.0000     0.2178     472.6990      0.2416
10      100.0000     0.2259     489.5328      0.2463
15      100.0000     0.2366     511.6851      0.2530
20      100.0000     0.2507     540.9598      0.2622
25      100.0000     0.2699     581.1941      0.2766
30      100.0000     0.2972     638.2797      0.2964
35      100.0000     0.3377     723.1217      0.3268
40      100.0000     0.4016     857.6656      0.3799
45      100.0000     0.5133    1093.2301      0.4788
50      100.0000     0.7452    1583.7464      0.6964
55      100.0000     1.4600    3098.2417      1.3968
60      100.0000****************************************
65      100.0000     1.4600    3098.2417      1.5555
70      100.0000     0.7452    1583.7464      0.8559
75      100.0000     0.5133    1093.2301      0.6394
80      100.0000     0.4016     857.6656      0.5446
85      100.0000     0.3377     723.1217      0.5001
90      100.0000     0.2972     638.2797      0.4860
 95     100.0000     0.2699     581.1941      0.4932
100     100.0000     0.2507     540.9598      0.5290
105     100.0000     0.2366     511.6851      0.6113
110     100.0000     0.2259     489.5328      0.8039
115     100.0000     0.2178     472.5990      1.4351
120     100.0000****************************************
125     100.0000     0.2063     448.8268      1.2594
130     100.0000     0.2022     440.3597      0.6298
135     100.0000     0.1989     433.4794      0.4379
140     100.0000     0.1961     427.8470      0.3630
145     100.0000     0.1939     423.2152      0.3088
150     100.0000     0.1920     419.4020      0.2834
155     100.0000     0.1905     416.2737      0.2678
160     100.0000     0.1893     413.7339      0.2576
165     100.0000     0.1883     411.7160      0.2507
170     100.0000     0.1876     410.1793      0.2458
175     100.0000     0.1870     409.1089      0.2423
180     100.0000     0.1867     408.5173      0.2397
185     100.0000     0.1867     408.4519      0.2379
190     100.0000     0.1870     409.0091      0.2366
195     100.0000     0.1876     410.3616      0.2360
200     100.0000     0.1888     412.8119      0.2359
205     100.0000     0.1908     416.9002      0.2366
210     100.0000     0.1941     423.6422      0.2385
215     100.0000     0.1997     435.0986      0.2424
220     100.0000     0.2097     455.9309      0.2502
225     100.0000     0.2302     498.4583      0.2671
230     100.0000     0.2809     604.1489      0.3115
235     100.0000     0.4680     997.5888      0.4868
240     100.0000****************************************
245     100.0000     0.4680     997.5888      0.4867
250     100.0000     0.2809     604.1489      0.3112
255     100.0000     0.2302     498.4583      0.2667
260     100.0000     0.2097     455.9309      0.2501
265     100.0000     0.1997     435.0986      0.2434
270     100.0000     0.1941     423.6422      0.2419
275     100.0000     0.1908     416.9002      0.2446
280     100.0000     0.1888     412.8119      0.2530
285     100.0000     0.1876     410.3616      0.2731
290     100.0000     0.1870     409.0091      0.3258
295     100.0000     0.1867     408.4519      0.5281
300     100.0000****************************************
305     100.0000     0.1870     409.1089      0.5279
310     100.0000     0.1876     410.1793      0.3252
315     100.0000     0.1883     411.7160      0.2715
320     100.0000     0.1893     413.7339      0.2503
325     100.0000     0.1906     416.2737      0.2409
330     100.0000     0.1920     419.4020      0.2359
335     100.0000     0.1939     423.2152      0.2335
340     100.0000     0.1961     427.8470      0.2325
345     100.0000     0.1989     433.4794      0.2326
350     100.0000     0.2022     440.3597      0.2336
355     100.0000     0.2063     448.8268      0.2353
360     100.0000     0.2114     459.3513      0.2379
TT0  --  STOP  --END OF BCAS PROGRAM--
>
```

PROGRAM LISTING

FOR

THE

MONTE CARLO SIMULATION

MONTE CARLO SIMULATION

ATTACHMENT III

```
>SET UIC=[110,110]
>PIP DK1:/LI

DIRECTORY DK1:[110,110]
22-MAR-78 08:50

SREAD.FTN;32         12.           17-MAR-78 09:01
ALGOR.FTN;203        24.           17-MAR-78 09:01
ALGOR.OBJ;1          58.           17-MAR-78 09:01
DRIVE.OBJ;1          28.           17-MAR-78 09:01
VECTOR.OBJ;1         23.           17-MAR-78 09:01
CARLOS.OBJ;1         4.            17-MAR-78 09:01
MONT.OBJ;1           10.           17-MAR-78 09:01
SREAD.OBJ;1          21.           17-MAR-78 09:01
CAS.CMD;13           1.            17-MAR-78 09:01
CAST.TSK;2           60.       C   17-MAR-78 09:01
MONT.FTN;7           6.            17-MAR-78 09:01
CARLOS.FTN;5         2.            17-MAR-78 09:01
DRIVE.FTN;107        23.           17-MAR-78 09:01
CAST.TSK;1           60.       C   17-MAR-78 09:01
VECTOR.FTN;47        10.           17-MAR-78 09:01

      TOTAL OF 342. BLOCKS IN 15. FILES
```

```
>PIP TI:=DK1:CAS.CMD
DK1:CAST=DK1:DRIVE,DK1:VECTOR,DK1:MONT,DK1:ALGOR,DK1:CARLOS,DK1:SREAD
/
LIBR=FORRES:RO
//
>
```

```
>`IP TI:=DK1:SREAD.FTN
C----- ----- ----- ----- ----- ----- ----- -----
C-----READ IN ONE SIGMA ERRORS-----
C----- ----- ----- ----- ----- ----- ----- -----
C
C----- READ IN CASE#1 ERRORS -----
C
      SUBROUTINE SREAD1(ALF10S,ALF1TS,ALF20S,ALF2TS,
     +                  RHO10S,RHO20S,H0S,HTS,BIAS)
      DOUBLE PRECISION ALF10S,ALF1TS,ALF20S,ALF2TS
      DOUBLE PRECISION RHO10S,RHO20S,H0S,HTS
      DOUBLE PRECISION CONVDR,CONVNM,BIAS
      DATA CONVDR/57.2957795131D0/     !DEG -- RAD
      DATA CONVNM/6076.115D0/          !NM CONVERSION
C
          CALL ALF (ALF10S,ALF20S)
          CALL ALFT(ALF1TS,ALF2TS)
          CALL RHO (RHO10S,RHO20S)
C
          WRITE(5,40)
          READ(5,11)H0S,HTS
      H0S=H0S/CONVNM
      HTS=HTS/CONVNM
C
          WRITE(5,50)
          READ(5,12)BIAS
      BIAS=BIAS/CONVDR
C
      RETURN
40    FORMAT(1H$,'  ALT 0, ALT (T) ERRORS (FT) --> ')
50    FORMAT(1H$,'  BIAS ON ALF20 (DEG) --> ')
11    FORMAT(2F10.4)
12    FORMAT(F10.4)
       END
C
C----- READ IN CASE#2 ERRORS -----
C
      SUBROUTINE SREAD2(ALF10S,ALF1TS,RHO10S,DTOA1S)
      DOUBLE PRECISION ALF10S,ALF1TS,RHO10S,DTOA1S
      DOUBLE PRECISION CONVDR,CONVNM
      DATA CONVDR/57.2957795131D0/     !DEG--RAD
      DATA CONVNM/6076.115D0/          !NM CONVERSION
C
          WRITE(5,10)
          READ(5,1)ALF10S
      ALF10S=ALF10S/CONVDR
C
          WRITE(5,20)
          READ(5,1)ALF1TS
      ALF1TS=ALF1TS/CONVDR
C
          WRITE(5,30)
          READ(5,1)RHO10S
      RHO10S=RHO10S/CONVNM
C
          WRITE(5,40)
          READ(5,1)DTOA1S
      DTOA1S=DTOA1S/CONVNM
C
       RETURN
1     FORMAT(F10.4)
10    FORMAT(1H$,'  ALF10 ERROR (DEG) -->')
20    FORMAT(1H$,'  ALF1T ERROR (DEG) -->')
30    FORMAT(1H$,'  RHO10 RANGE ERROR (FT) -->')
40    FORMAT(1H$,'  DELTA TOA ERROR (FT) -->')
       END
C
C----- READ IN CASE# AND CASE#12 ERRORS -----
C
      SUBROUTINE SREAD3(ALF10S,ALF1TS,RHO10S,DTOA1S,RHO0TS)

      DOUBLE PRECISION ALF10S,ALF1TS,RHO10S,DTOA1SRHO0TS,CO
NVNM
      DATA CONVNM/6076.115D0/          !NM CONVERSION
C
      CALL SREAD2(ALF10S,ALF1TS,RHO10S,DTOA1S)
      CALL RHO1(RHO0TS)
C
      RETURN
       END
C
C-----READ IN CASE#4 ERRORS -----
C
      SUBROUTINE SREAD4(ALF10S,ALF1TS,DTOA1S,RHO0TS)
      DOUBLE PRECISION ALF10S,ALF1TS,DTOA1S,RHO0TS,CONVNM,C
ONVDR
      DATA CONVNM/6076.115D0/          !NM CONVERSION
      DATA CONVDR/57.2957795131D0/     !DEG -- RAD
C
          WRITE(5,10)
          READ(5,1)ALF10S
      ALF10S=ALF10S/CONVDR
C
          WRITE(5,20)
          READ(5,1)ALF1TS
      ALF1TS=ALF1TS/CONVDR
C
          WRITE(5,30)
          READ(5,1)DTOA1S
      DTOA1S=DTOA1S/CONVNM
C
      CALL RHO1(RHO0TS)
C
      RETURN
1     FORMAT(F10.4)
10    FORMAT(1H$,'  ALF10 ERROR (DEG) -->')
20    FORMAT(1H$,'  ALF1T ERROR (DEG) -->')
30    FORMAT(1H$,'  DTOA1 ERROR (FT) -->')
       END
C
C-----READ IN CASE#5 ERRORS -----
C
      SUBROUTINE SREAD5(ALF10S,ALF20S,ALF1TS,ALF2TS,DTOA1S,
DTOA2S)
      DOUBLE PRECISION ALF10S,ALF20S,ALF1TS,ALF2TS,DTOA1S,D
```

```
TOA2S
          CALL ALF (ALF10S,ALF20S)
          CALL ALFT(ALF1TS,ALF2TS)
          CALL TOA (DTOA1S,DTOA2S)
      RETURN
       END
C
C-----READ IN CASE#6 ERRORS -----
C
      SUBROUTINE SREAD6(ALF10S,ALF20S,RHO10S,RHO20S,DTOA1S,DTOA2S)
      DOUBLE PRECISION ALF10S,ALF20S,RHO10S,RHO20S,DTOA1S,DTOA2S
          CALL ALF (ALF10S,ALF20S)
          CALL RHO (RHO10S,RHO20S)
          CALL TOA (DTOA1S,DTOA2S)
      RETURN
       END
C
C-----READ IN CASE#7 ERRORS-----
C
      SUBROUTINE SREAD7(ALF10S,ALF20S,ALF1TS,ALF2TS,
     +                  RHO10S,RHO20S,DTOA1S,DTOA2S)
      DOUBLE PRECISION ALF10S,ALF20S,ALF1TS,ALF2TS
      DOUBLE PRECISION RHO10S,RHO20S,DTOA1S,DTOA2S
          CALL ALF (ALF10S,ALF20S)
          CALL ALFT(ALF1TS,ALF2TS)
          CALL RHO (RHO10S,RHO20S)
          CALL TOA (DTOA1S,DTOA2S)
      RETURN
       END
C
C-----READ IN CASE#8 ERRORS-----
C
      SUBROUTINE SREAD8(RHO10S,RHO1TS,ALF10S,ALF1TS)
      DOUBLE PRECISION RHO10S,RHO1TS,ALF10S,ALF1TS
      DOUBLE PRECISION CONVDR,CONVNM
      DATA CONVDR/57.295775131D0/       !DEG--RAD
      DATA CONVNM/6076.115D0/           !NM CONVERSION
C
          WRITE(5,10)
          READ(5,1)ALF10S,ALF1TS
      ALF10S=ALF10S/CONVDR
      ALF1TS=ALF1TS/CONVDR
C
          WRITE(5,20)
          READ(5,1)RHO10S,RHO1TS
      RHO10S=RHO10S/CONVNM
      RHO1TS=RHO1TS/CONVNM
C
      RETURN
1     FORMAT(2F10.4)
10    FORMAT(1H$,'  ALF10,ALF1T ERRORS (DEG) -->')
20    FORMAT(1H$,'  RHO10,RHO1T ERRORS (FT) -->')
       END
C
C-----READ IN CASE#11 ERRORS-----
C
      SUBROUTINE SREADB(RHO0TS,BETAS)
      DOUBLE PRECISION RHO0TS,BETAS,CONVDR
```

```
      DATA CONVDR/57.2957795131D0/
C
          CALL RHO1(RHO0TS)
C
          WRITE(5,20)
          READ(5,1)BETAS
      BETAS=BETAS/CONVDR
C
      RETURN
      FORMAT(F10.4)
      FORMAT(1H$,'  TARGET BEARING ERROR (FT) -->')
       END
C
C..... ..... ..... ..... .....
C
      SUBROUTINE ALF(ALF10S,ALF20S)
      DOUBLE PRECISION ALF10S,ALF20S,CONVDR
      DATA CONVDR/57.29775131D0/        !DEG--RAD
C
          WRITE(5,10)
          READ(5,1)ALF10S,ALF20S
      ALF10S=ALF10S/CONVDR
      ALF20S=ALF20S/CONVDR
C
      RETURN
1     FORMAT(2F10.4)
10    FORMAT(1H$,'  ALF10,ALF20 ERRORS (DEG) -->')
       END
C
C..... ..... ..... ..... .....
C
      SUBROUTINE ALFT(ALF1TS,ALF2TS)
      DOUBLE PRECISION ALF1TS,ALF2TS,CONVDR
      DATA CONVDR/57.29775131D0/        !DEG--RAD
C
          WRITE(5,10)
          READ(5,1)ALF1TS,ALF2TS
      ALF1TS=ALF1TS/CONVDR
      ALF2TS=ALF2TS/CONVDR
C
      RETURN
1     FORMAT(2F10.4)
10    FORMAT(1H$,'  ALF1T,2T ERRORS (DEG) -->')
       END
C
C..... ..... ..... ..... .....
C
      SUBROUTINE RHO(RHO10S,RHO20S)
      DOUBLE PRECISION RHO10S,RHO20S,CONVNM
      DATA CONVNM/6076.115D0/           !FT--NM
C
          WRITE(5,10)
          READ(5,1)RHO10S,RHO20S
      RHO10S=RHO10S/CONVNM
      RHO20S=RHO20S/CONVNM
C
      RETURN
1     FORMAT(2F10.4)
```

```
10      FORMAT(1H$,'  RHO10,RHO20 RANGE ERRORS (FT) -->')
         END
C
C..... ..... ..... ..... .....
C
        SUBROUTINE TOA(DTOA1S,DTOA2S)
        DOUBLE PRECISION DTOA1S,DTOA2S,CONUNM
        DATA CONUNM/6076.115D0/          !FT--NM
C
            WRITE(5,10)
            READ(5,1)DTOA1S,DTOA2S
        DTOA1S=DTOA1S/CONUNM
        DTOA2S=DTOA2S/CONUNM
C
        RETURN
1       FORMAT(2F10.4)
10      FORMAT(1H$,'  TOA1,TOA2 ERRORS (FT) -->')
         END
C
C..... ..... ..... ..... .....
C
        SUBROUTINE RHO1(RHO0TS)
        DOUBLE PRECISION RHO0TS,CONUNM
        DATA CONUNM/6076.115D0/
C
            WRITE(5,10)
            READ(5,1)RHO0TS
        RHO0TS=RHO0TS/CONUNM
C
        RETURN
1       FORMAT(F10.4)
10      FORMAT(1H$,'  TARGET RANGE ERROR (FT) -->')
         END
>
```

```
>PIP TI:=DK1:ALGOR.FTN
      SUBROUTINE ALGOR1(ALF10,ALFD1,ALF20,ALFD2,
     1                  RHO10,RHO20,H0,HT,RHOV0T)
C
C
      DOUBLE PRECISION ALF10,ALFD1,ALF20,ALFD2
      DOUBLE PRECISION RHO10,RHO20,H0,HT
      DOUBLE PRECISION D10,D20,D1T,D2T,D12,DV12(3)
      DOUBLE PRECISION EV10(3),EV20(3),EV1T(3),EV2T(3),EV012(3)
      DOUBLE PRECISION EV12(3),TEMPV(3),TEMP
      DOUBLE PRECISION A,GAMMA,BETA1,BETA2,ALF1T,ALF2T
      DOUBLE PRECISION RHOV12(3),RHOV2T(3),RHOV1T(3)
      DOUBLE PRECISION RHOV1(3),RHOV2(3),RHOV0T(3),RHO0T
      DOUBLE PRECISION RHOV10(3),RHOV20(3),CONVDR
C
      DATA CONVDR/57.2957795131D0/     !DEG --> RADIAN CONV FACTOR
C
      D10=DSQRT(RHO10*RHO10-H0*H0)
      D20=DSQRT(RHO20*RHO20-H0*H0)
C
      EV10(1)=COS(ALF10)
      EV10(2)=SIN(ALF10)
      EV10(3)=0.0D0
C
      EV20(1)=COS(ALF20)
      EV20(2)=SIN(ALF20)
      EV20(3)=0.0D0
C
      RHOV10(1)=D10*DCOS(ALF10)
      RHOV10(2)=D10*DSIN(ALF10)
      RHOV10(3)=H0
C
      RHOV20(1)=D20*DCOS(ALF20)
      RHOV20(2)=D20*DSIN(ALF20)
      RHOV20(3)=H0
C
      CALL SUB(RHOV10,RHOV20,RHOV12)
C
      ALF1T=ALF10+ALFD1
      ALF2T=ALF20+ALFD2
C
      EV1T(1)=COS(ALF1T)
      EV1T(2)=SIN(ALF1T)
      EV1T(3)=0.0D0
C
      EV2T(1)=COS(ALF2T)
      EV2T(2)=SIN(ALF2T)
      EV2T(3)=0.0D0
C
      CALL LATERL(RHOV12,DV12)
      CALL UNIT(DV12,EV12)
      CALL MAG(DV12,D12)
C
      CALL CROSS(EV2T,EV1T,TEMPV)
      CALL DOT(EV2T,EV1T,TEMP)
      GAMMA=DATAN2(TEMPV(3),TEMP)
C
      CALL CROSS(EV1T,EV12,TEMPV)
      CALL DOT(EV1T,EV12,TEMP)
      BETA1=DATAN2(TEMPV(3),TEMP)
C
      A=-1.0D0
      CALL MULT(EV12,A,EV012)
      CALL CROSS(EV012,EV2T,TEMPV)
      CALL DOT(EV012,EV2T,TEMP)
      BETA2=DATAN2(TEMPV(3),TEMP)
C
      D1T=DABS(D12*DSIN(BETA2)/DSIN(GAMMA))
      D2T=DABS(D12*DSIN(BETA1)/DSIN(GAMMA))
C
      RHOV1T(1)=D1T*DCOS(ALF1T)
      RHOV1T(2)=D1T*DSIN(ALF1T)
      RHOV1T(3)=HT
C
      RHOV2T(1)=D2T*DCOS(ALF2T)
      RHOV2T(2)=D2T*DSIN(ALF2T)
      RHOV2T(3)=HT
C
      CALL SUB(RHOV1T,RHOV10,RHOV1)
      CALL SUB(RHOV2T,RHOV20,RHOV2)
C
      CALL ADD(RHOV1,RHOV2,RHOV0T)
      A=0.5D0
      CALL MULT(RHOV0T,A,RHOV0T)
C
      RETURN
       END
C----- ----- ----- ----- ----- ----- ----- -----
C     SINGLE SITE PASSIVE SOLUTION
C     NUMBER ONE
C----- ----- ----- ----- ----- ----- ----- -----
      SUBROUTINE SINPAS(ALF10,ALFD1,RHO10,DTOA1,RHOV0T)
C
      DOUBLE PRECISION ALF10,ALFD1,RHO10,DTOA1
      DOUBLE PRECISION RHO1T,RHO0T,TEMP
      DOUBLE PRECISION RHOV10(3),RHOV1T(3),RHOV0T(3)
C
      RHO1T=DTOA1*DTOA1+2.0D0*DTOA1*RHO10
      TEMP=2.0D0*(DTOA1+RHO10*(1.0D0-DCOS(ALFD1)))
      RHO1T=RHO1T/TEMP
C
      RHO0T=RHO10*(2.0D0*DTOA1+RHO10)*(1.0D0-DCOS(ALFD1))
      RHO0T=RHO0T/TEMP
C
      RHOV10(1)=RHO10*DCOS(ALF10)
      RHOV10(2)=RHO10*DSIN(ALF10)
      RHOV10(3)=0.0D0
C
      RHOV1T(1)=RHO1T*DCOS(ALF10+ALFD1)
      RHOV1T(2)=RHO1T*DSIN(ALF10+ALFD1)
      RHOV1T(3)=0.0D0
C
      CALL SUB(RHOV1T,RHOV10,RHOV0T)
C
      RETURN
       END
C----- ----- ----- ----- ----- ----- ----- -----
C     SINGLE SITE PASSIVE SOLUTION
C     NUMBER TWO
C----- ----- ----- ----- ----- ----- ----- -----
      SUBROUTINE SINPA2(ALF10,ALFD1,RHO10,DTOA1,RHOV0T)
C
      DOUBLE PRECISION ALF10,ALFD1,RHO10,DTOA1,BETA
      DOUBLE PRECISION RHO1T,RHO0T,TEMP,THETA,THETAB
      DOUBLE PRECISION RHOV0T(3)
C
      TEMP=2.0D0*(DTOA1+RHO10*(1.0D0-DCOS(ALFD1)))
```

```
      RHO0T=DTOA1*DTOA1
      RHO0T=RHO0T+2.0D0*RHO10*(DTOA1+RHO10)*(1.0D0-DCOS(ALFD1))
      RHO0T=RHO0T/TEMP
C
      TEMP=(DTOA1-2.0D0*RHO0T)*(DTOA1+2.0D0*RHO10)
      TEMP=TEMP/(2.0D0*RHO10*RHO0T)
      TEMP=TEMP+1.0D0
C
      CALL ARCCOS(TEMP,THETAB)
C
      IF(ALFD1  .GT.  0.0D0)  THETA=DABS(THETAB)
      IF(ALFD1  .LE.  0.0D0)  THETA=-DABS(THETAB)
C
      BETA=THETA+ALF10
C
      RHOV0T(1)=RHO0T*DCOS(BETA)
      RHOV0T(2)=RHO0T*DSIN(BETA)
      RHOV0T(3)=0.0D0
C
      RETURN
       END
C----- ----- ----- ----- ----- ----- ----- -----
C     SINGLE SITE SEMI-ACTIVE SOLUTION
C
C----- ----- ----- ----- ----- ----- ----- -----
      SUBROUTINE SINSEM(ALF10,ALFD1,RHO10,DTOA1,RHO0T,
     +                  RHOV0T)
C
      DOUBLE PRECISION ALF10,ALFD1,RHO10,DTOA1
      DOUBLE PRECISION BETA,RHO0T,X,RHO1T,DALF
      DOUBLE PRECISION THETA,RHOV0T(3),STHET,CTHET
C
      RHO1T=DTOA1+RHO10-RHO0T
C
      IF(DABS(RHO10+RHO0T-RHO1T)  .LE.  (250.0D0/6076.115)  .OR.
     +   DABS(RHO10-RHO0T-RHO1T)  .LE.  (500.0D0/6076.115))  GOTO 30
C
      X=(RHO10/RHO1T)+(RHO1T/RHO10)
      X=X-(RHO0T/RHO10)*(RHO0T/RHO1T)
      X=X*0.5D0
C
      CALL ARCCOS(X,DALF)
      DALF=DABS(DALF)
      DALF=DSIGN(DALF,ALFD1)
      STHET=RHO1T*DSIN(DALF)/RHO0T
       GOTO 35
C
30    STHET=RHO1T*DSIN(ALFD1)/RHO0T
C
35    CTHET=RHO1T*RHO1T-RHO10*RHO10-RHO0T*RHO0T
      CTHET=CTHET/(2.0D0*RHO10*RHO0T)
      X=DSQRT(1.0D0-STHET*STHET)
      CTHET=DSIGN(X,CTHET)
      THETA=DATAN2(STHET,CTHET)
      BETA=THETA+ALF10
C
      RHOV0T(1)=RHO0T*DCOS(BETA)
      RHOV0T(2)=RHO0T*DSIN(BETA)
      RHOV0T(3)=0.0D0
C
      RETURN
       END
C----- ----- ----- ----- ----- ----- ----- -----
C
```

```
C     ::LITCHFORD ALGORITHMS::
C         LITCH0::  SS SEMI-ACTIVE
C         LITCH1::  FULL UP WO RADAR RANGE
C
C----- ----- ----- ----- ----- ----- ----- -----
C
      SUBROUTINE LITCH0(ALF10,ALFD1,DTOA1,RHO0T,RHOV0T)
C
      DOUBLE PRECISION ALF10,ALFD1,DTOA1,RHO0T,RHOV0T(3)
      DOUBLE PRECISION B,C,A1,A2,RHO10,X,THETA,BETA,A0
C
      B=DTOA1-RHO0T
      C=DTOA1*(DTOA1-2.0D0*RHO0T)
      C=C/(2.0D0*(1.0D0-DCOS(ALFD1)))
C
         A0=B*B-4.0D0*C
         IF(A0  .LT.  0.0D0)A0=0.0D0
         A1=(-B+DSQRT(A0))/2.0D0
         A2=(-B-DSQRT(A0))/2.0D0
C
      RHO10=DMAX1(A1,A2)
C
         X=(DTOA1-2.0D0*RHO0T)*(DTOA1+2.0D0*RHO10)
         X=X/(2.0D0*RHO10*RHO0T)
         X=X+1.0D0
C
      CALL ARCCOS(X,THETA)
C
      IF(ALFD1  .GT.  0.0D0)  THETA = DABS(THETA)
      IF(ALFD1  .LE.  0.0D0)  THETA =-DABS(THETA)
C
        BETA=THETA+ALF10
C
      RHOV0T(1)=RHO0T*DCOS(BETA)
      RHOV0T(2)=RHO0T*DSIN(BETA)
      RHOV0T(3)=0.0D0
C
      RETURN
       END
C
C----- ----- ----- ----- ----- ----- ----- -----
C
      SUBROUTINE LITCH1(ALF10,ALF20,ALFD1,ALFD2,
     +                  DTOA1,DTOA2,RHOV0T,BETAT)
C
      DOUBLE PRECISION ALF10,ALF20,ALFD1,ALFD2
      DOUBLE PRECISION DTOA1,DTOA2,RHOV0T(3)
      DOUBLE PRECISION AL1,AL2,TEMP,A,B,C,PI,POSA
      DOUBLE PRECISION POS,THETA(4),NEG,RHOT(4),RHO0T
      DOUBLE PRECISION TAU1,TAU2,D(4),BET(4),BETA,X,BETAT
C
      DATA PI/3.141592654D0/        !THE CONSTANT PI
C     WRITE(5,288)ALF10,ALF20,ALFD1,ALFD2,DTOA1,DTOA2
288   FORMAT('  INPUTS -->',6F9.4)
      BETA=BETAT
C
      IF(BETA .GT. (PI+ALF10))  BETA=BETA-2.0D0*PI
C
      AL1=ALFD1/2.0D0
      AL2=ALFD2/2.0D0
      TEMP=ALF10-ALF20-AL2
C
      A=DTOA1*DCOS(AL1)*DCOS(TEMP)
      A=A-DTOA2*DCOS(AL2)*DCOS(AL1)
```

```
C
      B=-DTOA1*DCOS(AL1)*DSIN(TEMP)
      B=B-DTOA2*DCOS(AL2)*DSIN(AL1)
C
      C=(DTOA1-DTOA2)*(DCOS(AL1)*DCOS(AL2))
C
      POSA=(4.0D0*B*B-4.0D0*(C-A)*(C+A))
      IF(POSA .LT. 0.0D0)POSA=0.0D0
      POSA=DSQRT(POSA)
      POS=(-2.0D0*B+POSA)/(2.0D0*(C-A))
      THETA(1)=2.0D0*DATAN(POS)
      THETA(2)=THETA(1)+PI
C
      NEG=(-2.0D0*B-POSA)/(2.0D0*(C-A))
      THETA(3)=2.0D0*DATAN(NEG)
      THETA(4)=THETA(3)+PI
C
C     WRITE(5,292)THETA(1),THETA(2),THETA(3),THETA(4)
292   FORMAT('  THETA1..4 -->',4F10.4)
C
      DO 10 I = 1,4
         IF(THETA(I)  .GT.  PI)  THETA(I)=THETA(I)-2.0D0*PI
         BET(I)=THETA(I)+ALF10
         D(I)=DABS(BET(I)-BETA)
10    CONTINUE
C
      X=DMIN1(D(1),D(2),D(3),D(4))
      DO 20 I =1,4
         IF(X   .EQ.   D(I))GOTO 30
20    CONTINUE
      WRITE(5,666)D(1),D(2),D(3),D(4)
      WRITE(5,292)THETA(1),THETA(2),THETA(3),THETA(4)
      WRITE(5,668)BET(1),BET(2),BET(3),BET(4)
666   FORMAT('  D1...4 -->',4F10.3)
      WRITE(5,667)X,BETA,I
667   FORMAT('  X,BETA,I -->',2F10.3,I4)
668   FORMAT('  BET1...4 -->',4F10.3)
C
30    BETA=BET(I)
      RHO0T=DTOA1*DCOS(AL1)/(DCOS(BETA-ALF10-AL1)+DCOS(AL1))
C
      RHOV0T(1)=RHO0T*DCOS(BETA)
      RHOV0T(2)=RHO0T*DSIN(BETA)
      RHOV0T(3)=0.0D0
C
        RETURN
         END
C----- ----- ----- ----- ----- ----- ----- -----
C     RBX1::  IS CALLED BY MONTE6
C
      SUBROUTINE RBX1(ALF10,ALF20,RHO10,RHO20,
     +                DTOA1,DTOA2,RHOV0T,BETAT)
C
      DOUBLE PRECISION ALF10,ALF20,RHO10,RHO20
      DOUBLE PRECISION DTOA1,DTOA2,RHOV0T(3),T1,T2
      DOUBLE PRECISION A,B,C,PI,POSA
      DOUBLE PRECISION POS,THETA(4),NEG,RHOT(4),RHO0T
      DOUBLE PRECISION TAU1,TAU2,D(4),BET(4),BETA,X,BETAT
C
      DATA PI/3.141592654D0/          'THE CONSTANT PI
C     WRITE(5,288)ALF10,ALF20,ALFD1,ALFD2,DTOA1,DTOA2
288   FORMAT('  INPUTS -->',6F9.4)
      BETA=BETAT*PI/180.0D0
C
```

```
C
C
      T1=DTOA1*DTOA1+2.0D0*DTOA1*RHO10
      T2=DTOA2*DTOA2+2.0D0*DTOA2*RHO20
C
      A=RHO20*T1*DCOS(ALF20)
      A=A-RHO10*T2*DCOS(ALF10)
C
      B=RHO20*T1*DSIN(ALF20)
      B=B-RHO10*T2*DSIN(ALF10)
C
      C=T1*(DTOA2+RHO20)-T2*(DTOA1+RHO10)
C
      POSA=(4.0D0*B*B-4.0D0*(C-A)*(C+A))
      IF(POSA .LT. 0.0D0)POSA=0.0D0
      POSA=DSQRT(POSA)
      POS=(-2.0D0*B+POSA)/(2.0D0*(C-A))
      THETA(1)=2.0D0*DATAN(POS)
      THETA(2)=THETA(1)+PI
C
      NEG=(-2.0D0*B-POSA)/(2.0D0*(C-A))
      THETA(3)=2.0D0*DATAN(NEG)
      THETA(4)=THETA(3)+PI
C
C     WRITE(5,292)THETA(1),THETA(2),THETA(3),THETA(4)
292   FORMAT('  THETA1..4 -->',4F10.4)
C
      DO 10 I = 1,4
         CALL ANGMOD(THETA(I),BET(I))
         D(I)=DABS(BET(I)-BETA)
         IF(D(I)  .GT.  (1.5D0*PI))  D(I) = 2.0D0*PI-D(I)
10    CONTINUE
C
      X=DMIN1(D(1),D(2),D(3),D(4))
      DO 20 I =1,4
         IF(X   .EQ.   D(I))GOTO 30
20    CONTINUE
      WRITE(5,666)D(1),D(2),D(3),D(4)
      WRITE(5,292)THETA(1),THETA(2),THETA(3),THETA(4)
      WRITE(5,668)BET(1),BET(2),BET(3),BET(4)
666   FORMAT('  D1...4 -->',4F10.3)
      WRITE(5,667)X,BETA,I
667   FORMAT('  X,BETA,I -->',2F10.3,I4)
668   FORMAT('  BET1...4 -->',4F10.3)
C
30    BETA=BET(I)
      RHO0T=T1/(2.0D0*(DTOA1+RHO10*(1.0D0+DCOS(BETA-ALF10))))
C
      RHOV0T(1)=RHO0T*DCOS(BETA)
      RHOV0T(2)=RHO0T*DSIN(BETA)
      RHOV0T(3)=0.0D0
C
        RETURN
         END
C----- ----- ----- ----- ----- ----- ----- -----
C     FULLUP::  IS CALLED BY MONTE7
C----- ----- ----- ----- ----- ----- ----- -----
C
      SUBROUTINE FULLUP(ALF10,ALF20,ALFD1,ALFD2,RHO10,RHO20,
     +                  DTOA1,DTOA2,RHOV0T)
C
      DOUBLE PRECISION ALF10,ALF20,ALFD1,ALFD2,RHO10,RHO20
      DOUBLE PRECISION DTOA1,DTOA2,RHOV0T(3),TEMPV(3)
      DOUBLE PRECISION RHOV10(3),RHOV20(3),EV1T(3),EV2T(3)
```

```
      DOUBLE PRECISION RHOV12(3),RHO12,DV12(3),EV12(3)
      DOUBLE PRECISION SINGT,COSGT,SINB1,COSB1,SINB2,COSB2
      DOUBLE PRECISION D,GT,B1,B2,EPSIL,TEMP,RHO1T
      DOUBLE PRECISION RHO2T,RHO0T,K1,K2,SINB,COSB
C
      RHOV10(1)=RHO10*DCOS(ALF10)
      RHOV10(2)=RHO10*DSIN(ALF10)
      RHOV10(3)=0.0D0
C
      RHOV20(1)=RHO20*DCOS(ALF20)
      RHOV20(2)=RHO20*DSIN(ALF20)
      RHOV20(3)=0.0D0
C
      EV1T(1)=DCOS(ALF10+ALFD1)
      EV1T(2)=DSIN(ALF10+ALFD1)
      EV1T(3)=0.0D0
C
      EV2T(1)=DCOS(ALF20+ALFD2)
      EV2T(2)=DSIN(ALF20+ALFD2)
      EV2T(3)=0.0D0
C
      CALL SUB(RHOV10,RHOV20,RHOV12)
      CALL MAG(RHOV12,RHO12)
C
      CALL LATERL(RHOV12,DV12)
      CALL UNIT(DV12,EV12)
C
      CALL CROSS(EV2T,EV1T,TEMPV)
      SINGT=TEMPV(3)
      CALL DOT  (EV2T,EV1T,COSGT)
C
      CALL CROSS(EV1T,EV12,TEMPV)
      SINB1=TEMPV(3)
      CALL DOT  (EV1T,EV12,COSB1)
C
      D=-1.0D0
      CALL MULT(EV12,D,EV12)
      CALL CROSS(EV12,EV2T,TEMPV)
      SINB2=TEMPV(3)
      CALL DOT  (EV12,EV2T,COSB2)
C
      GT=DATAN2(SINGT,COSGT)
      B1=DATAN2(SINB1,COSB1)
      B2=DATAN2(SINB2,COSB2)
C
      EPSIL=DSIN(GT)*DSIN(GT)
      EPSIL=EPSIL/(DSIN(GT-B2)-DSIN(GT-B1))
      TEMP=((DTOA1-DTOA2)+(RHO10-RHO20))/RHO12
      TEMP=TEMP-(DSIN(B2)-DSIN(B1))/DSIN(GT)
      EPSIL=EPSIL*TEMP
C
      GT=GT+EPSIL
      B1=B1+EPSIL
      B2=B2+EPSIL
C
C-----RESOLVE FOR DELTA EPSILON-----
C
      EPSIL=DSIN(GT)*DSIN(GT)
      EPSIL=EPSIL/(DSIN(GT-B2)-DSIN(GT-B1))
      TEMP=((DTOA1-DTOA2)+(RHO10-RHO20))/RHO12
      TEMP=TEMP-(DSIN(B2)-DSIN(B1))/DSIN(GT)
      EPSIL=EPSIL*TEMP
C
      RHO1T=RHO12*DSIN(B2)/DSIN(GT)
      RHO2T=RHO12*DSIN(B1)/DSIN(GT)
C
      RHO0T=(DTOA1+RHO10-RHO1T+DTOA2+RHO20-RHO2T)/2.0D0
C
      K1=DTOA1*DTOA1+2.0D0*DTOA1*RHO10
      K1=K1/(2.0D0*RHO0T*RHO10)
      K1=K1-(DTOA1+RHO10)/RHO10
C
      K2=DTOA2*DTOA2+2.0D0*DTOA2*RHO20
      K2=K2/(2.0D0*RHO0T*RHO20)
      K2=K2-(DTOA2+RHO20)/RHO20
C
      SINB=K1*DCOS(ALF20)-K2*DCOS(ALF10)
      SINB=SINB/DSIN(ALF10-ALF20)
C
      COSB=K2*DSIN(ALF10)-K1*DSIN(ALF20)
      COSB=COSB/DSIN(ALF10-ALF20)
C
      RHOV0T(1)=RHO0T*COSB
      RHOV0T(2)=RHO0T*SINB
      RHOV0T(3)=0.0D0
C
      RETURN
       END
C----- ----- ----- ----- ----- ----- ----- -----
C     DABS4:: IS CALLED BY MONTE8
C----- ----- ----- ----- ----- ----- ----- -----
C
      SUBROUTINE DABS4(RHO10,RHO1T,ALF10,ALF1T,RHOV0T)
C
      DOUBLE PRECISION RHO10,RHO1T,ALF10,ALF1T,RHOV0T(3)
C
          RHOV0T(1)=-RHO10*DCOS(ALF10)+RHO1T*DCOS(ALF1T)
          RHOV0T(2)=-RHO10*DSIN(ALF10)+RHO1T*DSIN(ALF1T)
          RHOV0T(3)=0.0D0
C
      RETURN
       END
>
```

```
>PIP TI:=DK1:MONT.FTN
      SUBROUTINE MONT (RHO10,RHO1T,DTOA1,ALF10,ALF1T,
     +                 RHO20,RHO2T,DTOA2,ALF20,ALF2T,
     +                 RHO0T,BETA,H0,HT,EBV,ERV,IX,IY,BIAS,
     +                 RHO10S,RHO1TS,DTOA1S,ALF10S,ALF1TS,
     +                 RHO20S,RHO2TS,DTOA2S,ALF20S,ALF2TS,
     +                 RHO0TS,BETAS,H0S,HTS,RHOV0T,MONTE)
C
      DOUBLE PRECISION RHO10,RHO1T,DTOA1,ALF10,ALF1T
      DOUBLE PRECISION RHO20,RHO2T,DTOA2,ALF20,ALF2T
      DOUBLE PRECISION RHO0T,BETA,H0,HT,EBV(50),ERV(50),BIAS
      DOUBLE PRECISION RHO10S,RHO1TS,DTOA1S,ALF10S,ALF1TS
      DOUBLE PRECISION RHO20S,RHO2TS,DTOA2S,ALF20S,ALF2TS
      DOUBLE PRECISION RHO0TS,BETAS,H0S,HTS,RHOV0T(3),BETAX
C
      DOUBLE PRECISION DRHO10,DRHO1T,DDTOA1,DALF10,DALF1T
      DOUBLE PRECISION DRHO20,DRHO2T,DDTOA2,DALF20,DALF2T
      DOUBLE PRECISION DRHO0T,DBETA,DH0,DHT,DRHOV(3)
C
      DO 999 I =1,50,1
C
          CALL DIRTY(RHO10,RHO10S,DRHO10,IX,IY)
          CALL DIRTY(RHO1T,RHO1TS,DRHO1T,IX,IY)
          CALL DIRTY(DTOA1,DTOA1S,DDTOA1,IX,IY)
          CALL DIRTY(ALF10,ALF10S,DALF10,IX,IY)
          CALL DIRTY(ALF1T,ALF1TS,DALF1T,IX,IY)
C
          CALL DIRTY(RHO20,RHO20S,DRHO20,IX,IY)
          CALL DIRTY(RHO2T,RHO2TS,DRHO2T,IX,IY)
          CALL DIRTY(DTOA2,DTOA2S,DDTOA2,IX,IY)
          CALL DIRTY(ALF20,ALF20S,DALF20,IX,IY)
          CALL DIRTY(ALF2T,ALF2TS,DALF2T,IX,IY)
C
          CALL DIRTY(RHO0T,RHO0TS,DRHO0T,IX,IY)
          BETAX=BETA/57.2957795131D0
          CALL DIRTY(BETAX,BETAS,DBETA,IX,IY)
          CALL DIRTY(H0,H0S,DH0,IX,IY)
          CALL DIRTY(HT,HTS,DHT,IX,IY)
C
          DALFD1=DALF1T-DALF10
          DALFD2=DALF2T-DALF20
C
      GOTO (601,602,603,604,605,606,607,608,609,610,
     +     611,612,613,614,615,616,617,618,619,620),MONTE
C
601       CALL ALGOR1(DALF10,DALFD1,DALF20,DALFD2,
     +          DRHO10,DRHO20,DH0,DHT,DRHOV)
                GOTO 700
C
602       CALL SINPA2(DALF10,DALFD1,DRHO10,DDTOA1,DRHOV)
                GOTO 700
C
603       CALL SINSEM(DALF10,DALFD1,DRHO10,DDTOA1,DRHO0T,DRHOV)
                GOTO 700
C
604       CALL LITCH0(DALF10,DALFD1,DDTOA1,DRHO0T,DRHOV)
                GOTO 700
C
605       CALL LITCH1(DALF10,DALF20,DALFD1,DALFD2,
     +          DDTOA1,DDTOA2,DRHOV,BETAX)
                GOTO 700
C
606       CALL RBX1(DALF10,DALF20,DRHO10,DRHO20,DDTOA1,
     +          DDTOA2,RHO10S,RHO20S,DTOA1S,DTOA2S)
                GOTO 700
C
607       CALL FULLUP(DALF10,DALF20,DALFD1,DALFD2,
     +          DRHO10,DRHO20,DDTOA1,DDTOA2,DRHOV)
                GOTO 700
C
608       CALL DABS4(DRHO10,DRHO1T,DALF10,DALF1T,DRHOV)
                GOTO 700
C
609       CONTINUE
610       CONTINUE
          GOTO 620
C
611       CALL DIRANT(DRHO0T,DBETA,DRHOV)
                GOTO 700
C
C
612       CALL A3A12(DALF10,DALF1T,DRHO10,DDTOA1,DRHO0T,DRHOV)
                GOTO 700
C
613       CONTINUE
614       CONTINUE
615       CONTINUE
616       CONTINUE
617       CONTINUE
618       CONTINUE
619       CONTINUE
620       CONTINUE
C
          WRITE(5,1)
1         FORMAT('  MONTE SELECTED NOT IMPLEMENTED SUCKER')
          STOP
C
700       CALL ANGLE(DRHOV,RHOV0T,EBV(I),ERV(I))
C
999   CONTINUE
      RETURN
       END
>
```

```
>PIP TI:=DK1:CARLOS.FTN
C----- ----- ----- ----- ----- ----- -----
C       MONTE11:: CALLS DIRANT
C----- ----- ----- ----- ----- ----- -----
        SUBROUTINE DIRANT(RHO0T,BETAX,RHOV0T)
        DOUBLE PRECISION RHO0T,RHOV0T(3),BETAX
C
        RHOV0T(1)=RHO0T*DCOS(BETAX)
        RHOV0T(2)=RHO0T*DSIN(BETAX)
        RHOV0T(3)=0.0D0
C
        RETURN
         END
C----- ----- ----- ----- ----- ----- -----
C       MONTE12::MONTEC:: CALLS A3A12
C----- ----- ----- ----- ----- ----- -----
        SUBROUTINE A3A12(ALF10,ALF1T,RHO10,DTOA1,RHO0T,RHOV0T)
        DOUBLE PRECISION ALF10,ALF1T,RHO10,DTOA1,RHOV0T(3)
        DOUBLE PRECISION RHO1T,RHO0T,BETA
C
        RHO1T=DTOA1+RHO10-RHO0T
C
        BETA=RHO1T*DSIN(ALF1T-ALF10)
        BETA=ALF10+DATAN2(BETA,(RHO1T*DCOS(ALF1T-ALF10)-RHO10))
C
        RHOV0T(1)=RHO0T*DCOS(BETA)
        RHOV0T(2)=RHO0T*DSIN(BETA)
        RHOV0T(3)=0.0D0
C
        RETURN
         END
>
```

```
>PIF TI:+DK1:DRIVE.FTN
C----- ----- ----- ----- ----- ----- ----- ----- ----- -----
C
C       .....DRIVER FOR BCAS STUDIES
C
C       LAST AMENDED:  FEB 19/78
C       PROGRAMMED BY:  DEL WEATHERS
C
C          THIS DRIVER MAKES USE OF VECTOR NOTATION
C       FOR POSITION REPRESENTATION. THERE ARE TWO RADARS;
C       <1> AT 0,0 OF THE FRAMEWORK AND <2>'S POSITION
C       IS READ IN.  THERE ARE TWO AIRCRAFT. BOTH OF THEIR
C       RELATIVE POSITIONS ARE READ IN AS INPUTS.
C
C       CONVENTIONS:
C
C       VARIABLES CONTAINING A 'V' ARE USUALLY 3 ELEMENT VECTORS
C       VARIABLES CONTAINING 'RHO' ARE DISTANCES (NM)
C       VARIABLES CONTAINING 'ALF' ARE ANGLES (USUALLY RADIANS)
C       VARIABLES CONTAINING '1' REFER TO RADAR <1>
C       VARIABLES CONTAINING '2' REFER TO RADAR <2>
C       VARIABLES CONTAINING '0' REFER TO <OWN> AIRCRAFT
C       VARIABLES CONTAINING 'T' REFER TO <TARGET> AIRCRAFT
C       VARIABLES STARTING WITH 'D' HAVE BEEN DIRTIED (EXCEPT DTOA
C       VARIABLES ENDING WITH 'C' ARE IN DEGREES
C       VARIABLES ENDING WITH 'S' ARE ONE SIGMA ERRORS
C
C       FOR EXAMPLE:
C           RHO10 IS THE DISTANCE IN NM FROM RADAR <1> TO
C               <OWN> AIRCRAFT
C           DRHO10 IS THE DIRTY DISTANCE OF THE ABOVE EXAMPLE
C           DDTOA1 IS THE DIRTY DIFF TIME-OF-ARRIVAL WITH RADAR <1
C
C----- ----- ----- ----- ----- ----- ----- ----- ----- -----
        DOUBLE PRECISION UNITX(3),UNITY(3),UNITZ(3)
        DOUBLE PRECISION RHOV12(3),RHOV10(3),RHOV0T(3)
        DOUBLE PRECISION RHOV1T(3),RHOV20(3),RHOV2T(3)
        DOUBLE PRECISION DV1T(3),EV1T(3),TEMPV(3)
        DOUBLE PRECISION DV20(3),EV20(3),DV10(3),EV10(3)
        DOUBLE PRECISION DV2T(3),EV2T(3)
        DOUBLE PRECISION DV12(3),EV12(3),EOV12(3)
        DOUBLE PRECISION EV020(3),EV010(3),EV02T(3),EV01T(3)
        DOUBLE PRECISION ALF12,RHO12,H2,ALF12C,G,CEP,CEPV(50)
        DOUBLE PRECISION ALF10,RHO10,H0,ALF10C
        DOUBLE PRECISION BETA,RHO0T,HT
        DOUBLE PRECISION RHO1T,SALF1T,TEMP,CALF1T
        DOUBLE PRECISION ALF1T,ALF1TC,RHO20,SALF20
        DOUBLE PRECISION CALF20,ALF20,ALF20C,RHO2T
        DOUBLE PRECISION SALF2T,CALF2T,ALF2T,ALF2TC
        DOUBLE PRECISION SALFD1,CALFD1,ALFD1,ALFD1C
        DOUBLE PRECISION SALFD2,CALFD2,ALFD2,ALFD2C
        DOUBLE PRECISION BETD1,BETD1C,SBETD1,CBETD1
        DOUBLE PRECISION BETD2,BETD2C,SBETD2,CBETD2
        DOUBLE PRECISION DTOA1,DTOA2,CONVDR,CONVNM
        DOUBLE PRECISION SGAM0,CGAM0,GAM0,GAM0C
        DOUBLE PRECISION SGAMT,CGAMT,GAMT,GAMTC
        DOUBLE PRECISION AVER1,AVER2,SDEV1,SDEV2,SDEV3
C
C----- ERROR VARIABLES -----
C
        DOUBLE PRECISION EBV(50),ERV(50),SD1(50),SD2(50)
        DOUBLE PRECISION ALF10S,ALF20S,ALF2TS,ALF1TS
        DOUBLE PRECISION RHO10S,RHO20S,RHO1TS,H0S,HTS,BIAS
        DOUBLE PRECISION DTOA1S,DTOA2S,RHO0TS,BETAS
C
        DATA CONVDR/57.2957795131D0/     !DEG --> RAD CONV FACTOR
        DATA CONVNM/6076.115D0/          !NM CONVERSION
C
C----- DEFINE THE UNIT BASE VECTORS
C
        DATA UNITX/1.0D0,0.0D0,0.0D0/
        DATA UNITY/0.0D0,1.0D0,0.0D0/
        DATA UNITZ/0.0D0,0.0D0,1.0D0/
C
C----- DECIDE WHICH CAS LOGIC TO USE
C
85      WRITE(5,790)
        READ(5,791)MONTE
C
        GOTO (71,72,73,74,75,76,77,78,85,85,81,73),MONTE
        IF(MONTE .GT. 12)GOTO 85
C
C----- READ IN ERROR VARIATIONS FOR ALL SIMULATIONS -----
C
71      CALL SREAD1(ALF10S,ALF1TS,ALF20S,ALF2TS,
     +        RHO10S,RHO20S,H0S,HTS,BIAS)
          GOTO 200
72      CALL SREAD2(ALF10S,ALF1TS,RHO10S,DTOA1S)
          GOTO 200
73      CALL SREAD3(ALF10S,ALF1TS,RHO10S,DTOA1S,RHO0TS)
          GOTO 200
74      CALL SREAD4(ALF10S,ALF1TS,DTOA1S,RHO0TS)
          GOTO 200
75      CALL SREAD5(ALF10S,ALF20S,ALF1TS,ALF2TS,DTOA1S,DTOA2S)
          GOTO 200
76      CALL SREAD6(ALF10S,ALF20S,RHO10S,RHO20S,DTOA1S,DTOA2S)
          GOTO 200
77      CALL SREAD7(ALF10S,ALF20S,ALF1TS,ALF2TS,
     +            RHO10S,RHO20S,DTOA1S,DTOA2S)
          GOTO 200
78      CALL SREAD8(RHO10S,RHO1TS,ALF10S,ALF1TS)
          GOTO 200
81      CALL SREADB(RHO0TS,BETAS)
          GOTO 200
C
C----- INPUT RADAR <2> POSITION RELATIVE TO RADAR <1>
C
200     WRITE(5,100)
        WRITE(5,101)
        READ(5,102)RHO12,ALF12C,H2
          IF(H2 .NE. 0.0)H2=H2/CONVNM
          ALF12=ALF12C/CONVDR
          RHOV12(1)=DSQRT(RHO12**2-H2**2)*DCOS(ALF12)
          RHOV12(2)=DSQRT(RHO12**2-H2**2)*DSIN(ALF12)
          RHOV12(3)=-H2
          WRITE(5,300)RHOV12
C
C----- INPUT <OWN> POSITION RELATIVE TO RADAR <1>
C
        WRITE(5,110)
        WRITE(5,111)
        READ(5,102)RHO10,ALF10C,H0
          IF(H0 .NE. 0.0)H0=H0/CONVNM
          ALF10=ALF10C/CONVDR
          RHOV10(1)=DSQRT(RHO10**2-H0**2)*DCOS(ALF10)
          RHOV10(2)=DSQRT(RHO10**2-H0**2)*DSIN(ALF10)
          RHOV10(3)=-H0
```

```
      WRITE(5,301)RHOV10
C
C----- INPUT <TARGET> POSITION RELATIVE TO <OWN>
C
      WRITE(5,120)
      WRITE(5,112)
      READ(5,142)RHO0T,HT
         IF(HT .NE. 0.0)HT=HT/CONVNM
C
C----- ----- BETA LOOP (EVERY <INPUT> DEGREES) -----
C
      KOUNT=1        !DISPERSION STAT COUNTER
      WRITE(5,780)
      READ(5,781)ISTART,INCREM
      WRITE(5,799)
      WRITE(5,800)
C
      DO 999 I = ISTART,360,INCREM
C
      BETA=DBLE(FLOAT(I))
      IX=0
      IY=0
C
C
      RHOV0T(1)=DSQRT(RHO0T**2-HT**2)*DCOS(BETA/CONVDR)
      RHOV0T(2)=DSQRT(RHO0T**2-HT**2)*DSIN(BETA/CONVDR)
      RHOV0T(3)=-HT
C
C----- COMPUTE <TARGET> POSITION RELATIVE TO RADAR <1>
C
      CALL ADD(RHOV10,RHOV0T,RHOV1T)
C
C----- COMPUTE RANGE OF <TARGET> TO RADAR <1>
C
      CALL DOT(RHOV1T,RHOV1T,RHO1T)
      RHO1T=DSQRT(RHO1T)
C
C----- COMPUTE AZIMUTH OF <TARGET> RELATIVE TO RADAR <1>
C
      CALL LATERL(RHOV1T,DV1T)
      CALL UNIT(DV1T,EV1T)
      CALL CROSS(UNITX,EV1T,TEMPU)
      SALF1T=TEMPU(3)                !SIN OF ALPHA 1T
      CALL DOT(UNITX,EV1T,TEMP)
      CALF1T=TEMP                    !COS OF ALPHA 1T
      ALF1T=DATAN2(SALF1T,CALF1T)
      ALF1TC=ALF1T*CONVDR            !CONVERT TO DEGREES
C
C----- COMPUTE POSITION OF <OWN> RELATIVE TO RADAR <2>
C
      CALL SUB(RHOV10,RHOV12,RHOV20)
C
C----- COMPUTE RANGE OF <OWN> TO RADAR <2>
C
      CALL DOT(RHOV20,RHOV20,RHO20)
      RHO20=DSQRT(RHO20)
C
C----- COMPUTE AZIMUTH OF <OWN> TO RADAR <2>
C
      CALL LATERL(RHOV20,DV20)
      CALL UNIT(DV20,EV20)
      CALL CROSS(UNITX,EV20,TEMPU)
      SALF20=TEMPU(3)                !SIN OF ALPHA 20
      CALL DOT(UNITX,EV20,TEMP)
      CALF20=TEMP                    !COS OF ALPHA 20
      ALF20=DATAN2(SALF20,CALF20)
      ALF20C=ALF20*CONVDR            !CONVERT TO DEGREES
C
C----- COMPUTE POSITION OF <TARGET> RELATIVE TO RADAR <2>
C
      CALL ADD(RHOV20,RHOV0T,RHOV2T)
C
C----- COMPUTE RANGE OF <TARGET> TO RADAR <2>
C
      CALL DOT(RHOV2T,RHOV2T,RHO2T)
      RHO2T=DSQRT(RHO2T)
C
C----- COMPUTE AZIMUTH OF <TARGET> TO RADAR <2>
C
      CALL LATERL(RHOV2T,DV2T)
      CALL UNIT(DV2T,EV2T)
      CALL CROSS(UNITX,EV2T,TEMPU)
      SALF2T=TEMPU(3)                !SIN OF ALPHA 2T
      CALL DOT(UNITX,EV2T,TEMP)
      CALF2T=TEMP                    !COS OF ALPHA 2T
      ALF2T=DATAN2(SALF2T,CALF2T)
      ALF2TC=ALF2T*CONVDR            !COVERT TO DEGREES
C
C----- ----- ----- ----- ----- ----- -----
C----- COMPUTE DIFFERENTIAL AZIMUTHS -----
C----- ----- ----- ----- ----- ----- -----
C
      CALL LATERL(RHOV10,DV10)
      CALL UNIT(DV10,EV10)
      CALL CROSS(EV10,EV1T,TEMPU)
      SALFD1=TEMPU(3)                !SIN OF DIFF ALPHA 1
      CALL DOT(EV10,EV1T,TEMP)
      CALFD1=TEMP                    !COS OF DIFF ALPHA 1
      ALFD1=DATAN2(SALFD1,CALFD1)
      ALFD1C=ALFD1*CONVDR            !CONVERT TO DEGREES
C
C
      CALL CROSS(EV20,EV2T,TEMPU)
      SALFD2=TEMPU(3)                !SIN OF DIFF ALPHA 1
      CALL DOT(EV20,EV2T,TEMP)
      CALFD2=TEMP                    !COS OF DIFF ALPHA 2
      ALFD2=DATAN2(SALFD2,CALFD2)
      ALFD2C=ALFD2*CONVDR            !CONVERT TO DEGREES
C
C----- ----- ----- ----- ----- ----- ----- -----
C----- COMPUTE DIFFERENTIAL TIME OF ARRIVAL ----
C----- ----- ----- ----- ----- ----- ----- -----
C
      DTOA1=RHO1T+RHO0T-RHO10
      DTOA2=RHO2T+RHO0T-RHO20
C
C----- COMPUTE DIFFERENTIAL BETA1 AND BETA2 ANGLES -----
C
      CALL LATERL(RHOV12,DV12)
      CALL UNIT(DV12,EV12)
      CALL CROSS(EV10,EV12,TEMPU)
      SBETD1=TEMPU(3)                !SIN OF DIFF BETA 1
      CALL DOT(EV10,EV12,TEMP)
      CBETD1=TEMP                    !COS OF DIFF BETA 1
      BETD1=DATAN2(SBETD1,CBETD1)
      BETD1C=BETD1*CONVDR            !CONVERT TO DEGREES
C
C
```

```
      J=-1.0D0
      CALL MULT(EV10,Q,EOV10)
      CALL CROSS(EOV12,EV20,TEMPV)
      SBETD2=TEMPV(3)                   !SIN OF DIFF BETA 2
      CALL DOT(EOV12,EV20,TEMP)
      CBETD2=TEMP                       !COS OF DIFF BETA 2
      BETD2=DATAN2(SBETD2,CBETD2)
      BETD2C=BETD2*CONVDR               !CONVERT TO DEGREES
C----- ----- ----- ----- ----- ----- ----- ----- -----
C----- COMPUTE GAMMA <OWN> AND GAMMA <TARGET> -----
C----- ----- ----- ----- ----- ----- ----- ----- -----
      CALL MULT(EV10,G,EV010)
      CALL MULT(EV20,G,EV020)
      CALL CROSS(EV020,EV010,TEMPV)
      SGAM0=TEMPV(3)                    !SIN OF GAMMA <OWN>
      CALL DOT(EV020,EV010,TEMP)
      CGAM0=TEMP                        !COS OF GAMMA <OWN>
      GAM0=DATAN2(SGAM0,CGAM0)
      GAM0C=GAM0*CONVDR                 !CONVERT TO DEGREES
C
C
      CALL MULT(EV2T,Q,EV02T)
      CALL MULT(EV1T,G,EV01T)
      CALL CROSS(EV02T,EV01T,TEMPV)
      SGAMT=TEMPV(3)
      CALL DOT(EV02T,EV01T,TEMP)
      CGAMT=TEMP                        !COS GAMMA <TARGET>
      GAMT=DATAN2(SGAMT,CGAMT)
      GAMTC=GAMT*CONVDR                 !CONVERT TO DEGREES
C
C----- ----- ----- ----- ----- ----- ----- -----
C----- MONTE CARLO CASE NUMBERS  -----
C
C       (1).....DUAL SITE
C       (2).....SINGLE SITE PASSIVE
C       (3).....SINGLE SITE SEMI-ACTIVE
C       (4).....SS LITCHFORD SEMI-ACTIVE
C       (5).....LITCHFORD W/O RADAR RANGE
C       (6).....RBX WO DELTA ALPHA
C       (7).....RBX WITH ALL MEASUREMENTS
C       (8).....DABS
C       (9).....?
C       (10)....3-D SOLUTION
C       (11)....DIRECTION ANTENNA
C       (12)....SS SEMI-ACTIVE ENHANCED
C
C----- ----- ----- ----- ----- ----- ----- -----
C
C
      CALL MONT (RHO10,RHO1T,DTOA1,ALF10,ALF1T,
     +           RHO20,RHO2T,DTOA2,ALF20,ALF2T,
     +           RHO0T,BETA,H0,HT,EBV,ERV,IX,IY,BIAS,
     +           RHO10S,RHO1TS,DTOA1S,ALF10S,ALF1TS,
     +           RHO20S,RHO2TS,DTOA2S,ALF20S,ALF2TS,
     +           RHO0TS,BETAS,H0S,HTS,RHOV0T,MONTE)
C
C----- ----- ----- ----- ----- ----- ----- -----
C
600   CALL STAT1(EBV,AVER1,SDEV1,50)
      CALL STAT1(ERV,AVER2,SDEV2,50)
    CEPV(KOUNT)=DSQRT(SDEV2*SDEV2+RHO0T*RHO0T*SDEV1*SDEV1)*CONVNM
C
      AVER1=AVER1*CONVDR            !RADS --> DEGS
      SDEV1=SDEV1*CONVDR            !RADS --> DEGS
      AVER2=AVER2*CONVNM            !NM --> FEET
      SDEV2=SDEV2*CONVNM            !NM --> FEET
C
      WRITE(5,700)BETA,AVER1,SDEV1,AVER2,SDEV2,CEPV(KOUNT)
C
        SD1(KOUNT)=SDEV1     !DISPERSION STATISTICS
        SD2(KOUNT)=SDEV2
        KOUNT=KOUNT+1
C
999   CONTINUE
C
        KOUNT=KOUNT-1        !BUMPED IN LOOP ONCE TOO MANY
        CALL STAT1(SD1,AVER1,SDEV1,KOUNT)    ! DISPERSION STATS
        CALL STAT1(SD2,AVER2,SDEV2,KOUNT)
        CALL STAT1(CEPV,CEP,SDEV3,KOUNT)
C
        WRITE(5,701)AVER1,SDEV1,AVER2,SDEV2,CEP,SDEV3
C
C
100   FORMAT('  INPUT RADAR <2> POSITION RELATIVE TO RADAR <1>')
101   FORMAT(1H$,'  DISTANCE(NM), BEARING(DEG) AND HEIGHT(FT) -->
')
102   FORMAT(3F10.3)
103   FORMAT(F10.3)
110   FORMAT('  INPUT <OWN> POSITION RELATIVE TO RADAR <1>')
111   FORMAT(1H$,'  DISTANCE(NM), BEARING(DEG) AND ALTITUDE(FT) -
->')
112   FORMAT(1H$,'  DISTANCE(NM) AND ALTITUDE(FT) -->')
120   FORMAT('  INPUT <TARGET> POSITION RELATIVE TO <OWN>')
142   FORMAT(2F10.4)
300   FORMAT('  VECTOR RHOV12 -->  ',3F10.3,/)
301   FORMAT('  VECTOR RHOV10 -->  ',3F10.3,/)
700   FORMAT(F10.1,2F10.4,2F12.4,1F12.4)
701   FORMAT(/,' DISPERSION SUMMARY ',/,6F11.4)
780   FORMAT(1H$,'  BETA START, INCREMENT (DEG) -->')
781   FORMAT(2I4)
790   FORMAT(1H$,'  WHICH CAS LOGIC (1,2,3,...,12) -->')
791   FORMAT(I4)
799   FORMAT(//,'                --- BEARING ---          --- RANGE
---')
800   FORMAT(/,'     BETA     AVER     S.D.          AVER      S.
D.',/)
      STOP' --END OF BCAS PROGRAM--'
       END
>
```

```
>PIP TI:=DK1:VECTOR.FTN
C----- ----- ----- ----- ----- ----- -----
C
C       THESE ROUTINES HELP IN OPERATING
C       ON 3-ELEMENT VECTORS.
C
C               1.  DOT
C               2.  CROSS
C               3.  ADD
C               4.  SUB
C               5.  MULT
C               6.  MAG
C               7.  LATERL
C               8.  UNIT
C
C       MISCELL ROUTINES
C
C               1.  GAUSS
C               2.  DIRTY
C               3.  STAT
C               4.  ANGLE
C               5.  ARCCOS
C               6.  ANGMOD
C
C----- ----- ----- ----- ----- ----- -----
C
        SUBROUTINE DOT(VA,VB,SC)
        DOUBLE PRECISION VA(3),VB(3),SC
C
            SC=VA(1)*VB(1)+VA(2)*VB(2)+VA(3)*VB(3)
C
        RETURN
         END
C
C----- ----- ----- ----- ----- ----- -----
C
        SUBROUTINE CROSS(VA,VB,VC)
        DOUBLE PRECISION VA(3),VB(3),VC(3)
C
            VC(1)=VA(2)*VB(3)-VA(3)*VB(2)
            VC(2)=VA(3)*VB(1)-VA(1)*VB(3)
            VC(3)=VA(1)*VB(2)-VA(2)*VB(1)
C
        RETURN
         END
C
C----- ----- ----- ----- ----- ----- -----
C
        SUBROUTINE ADD(VA,VB,VC)
        DOUBLE PRECISION VA(3),VB(3),VC(3)
C
            VC(1)=VA(1)+VB(1)
            VC(2)=VA(2)+VB(2)
            VC(3)=VA(3)+VB(3)
C
        RETURN
         END
C
C----- ----- ----- ----- ----- ----- -----
C
        SUBROUTINE SUB(VA,VB,VC)
        DOUBLE PRECISION VA(3),VB(3),VC(3)
C
            VC(1)=VA(1)-VB(1)
            VC(2)=VA(2)-VB(2)
            VC(3)=VA(3)-VB(3)
C
        RETURN
         END
C
C----- ----- ----- ----- ----- ----- -----
C
        SUBROUTINE MULT(VA,B,VC)
        DOUBLE PRECISION VA(3),VC(3),B
C
            VC(1)=B*VA(1)
            VC(2)=B*VA(2)
            VC(3)=B*VA(3)
C
        RETURN
         END
C
C----- ----- ----- ----- ----- ----- -----
C
        SUBROUTINE MAG(VA,A)
        DOUBLE PRECISION VA(3),A
C
            A=DSQRT(VA(1)*VA(1)+VA(2)*VA(2)+VA(3)*VA(3))
C
        RETURN
         END
C
C----- ----- ----- ----- ----- ----- -----
C
        SUBROUTINE LATERL(VA,VB)
        DOUBLE PRECISION VA(3),VB(3)
C
            VB(1)=VA(1)
            VB(2)=VA(2)
            VB(3)=0.0D0
C
        RETURN
         END
C
C----- ----- ----- ----- ----- ----- -----
C
        SUBROUTINE UNIT(VA,VE)
        DOUBLE PRECISION VA(3),VE(3),A
C
            CALL MAG(VA,A)
            IF(A .NE. 0.0D0)A=1.0D0/A
            CALL MULT(VA,A,VE)
C
        RETURN
         END
C
C----- ----- ----- ----- ----- ----- -----
C
        SUBROUTINE GAUSS(IX,IY,DIRT)
        DOUBLE PRECISION DIRT
C
        DIRT=-6.0D0
C
        DO 999 I=1,12,1
            TEMP=RAN(IX,IY)
            DIRT=DIRT+DBLE(TEMP)
999         CONTINUE
```

```
C
        RETURN
         END
C
C----- ----- ----- ----- ----- ----- -----
C
        SUBROUTINE DIRTY(A,B,C,IX,IY)
        DOUBLE PRECISION A,B,C,DIRT
C
            CALL GAUSS(IX,IY,DIRT)
            C=A+B*DIRT
C
        RETURN
         END
C
C----- ----- ----- ----- ----- ----- -----
C
        SUBROUTINE STAT(VECTOR,AVER,SDEV)
        DOUBLE PRECISION VECTOR(50),SUM,DIFF,AVER,SDEV
C
            SUM=0.0D0
C
        DO 10 I = 1,50
            SUM=SUM+VECTOR(I)
10          CONTINUE
C
            AVER=SUM/50.0D0
            SUM=0.0D0
C
        DO 20 I=1,50
            DIFF=(VECTOR(I)-AVER)*(VECTOR(I)-AVER)
            SUM=SUM+DIFF
20          CONTINUE
C
        SDEV=DSQRT(SUM/49.0D0)
C
        RETURN
         END
C
C----- SPECIAL ANGLE CALCULATION -----
C
        SUBROUTINE ANGLE(DRHOV,RHOV0T,EB,ER)
C
        DOUBLE PRECISION DRHOV(3),RHOV0T(3),EB,ER
        DOUBLE PRECISION DVD0T(3),DV0T(3),EVD0T(3),EV0T(3)
        DOUBLE PRECISION TEMPV(3),TEMP,DRHO,RHO0T
C
        CALL LATERL(DRHOV,DVD0T)
        CALL LATERL(RHOV0T,DV0T)
        CALL UNIT(DVD0T,EVD0T)
        CALL UNIT(DV0T,EV0T)
C
        CALL CROSS(EV0T,EVD0T,TEMPV)
        CALL DOT(EV0T,EVD0T,TEMP)
        EB=DATAN2(TEMPV(3),TEMP)
C
        CALL MAG(DRHOV,DRHO)
        CALL MAG(RHOV0T,RHO0T)
        ER=DRHO-RHO0T
C
        RETURN
         END
C
C-----STATISTICS ROUTINE-----
```

```
C
        SUBROUTINE STAT1(VECTOR,AVER,SDEV,NUM)
        DOUBLE PRECISION VECTOR(50),SUM,DIFF,AVER,SDEV
C
            SUM=0.0D0
C
        DO 10 I = 1,NUM
            SUM=SUM+VECTOR(I)
10          CONTINUE
C
            AVER=SUM/DBLE(FLOAT(NUM))
            SUM=0.0D0
C
        DO 20 I=1,NUM
            DIFF=(VECTOR(I)-AVER)*(VECTOR(I)-AVER)
            SUM=SUM+DIFF
20          CONTINUE
C
        SDEV=DSQRT(SUM/DBLE(FLOAT(NUM-1)))
C
        RETURN
         END
C
C----- ARC COSINE ROUTINE -----
C
        SUBROUTINE ARCCOS(X,ANSWER)
C
        DOUBLE PRECISION X,ANSWER,PI
        DATA PI/3.141592654356D0/        !THE CONSTANT PI
C
        IF(X  .GT.  1.0D0)GOTO 40
        IF(X  .LT. -1.0D0)GOTO 50
        IF(X  .EQ.  0.0D0)GOTO 5
        IF((X .LT. 0.1D0)  .AND.  (X .GT. -0.1D0))GOTO 30
        IF(X  .GT.  0.0D0)GOTO 20
        IF(X  .LT.  0.0D0)GOTO 10
C----X EQ ZERO-----
5       ANSWER=PI/2.0D0
         RETURN
C-----X LT ZERO-----
10      ANSWER=DATAN(DSQRT(1.0D0-X*X)/X)+PI
         RETURN
C-----X GT ZERO-----
20      ANSWER=DATAN(DSQRT(1.0D0-X*X)/X)
         RETURN
C-----CLOSE TO ZERO-----
30      ANSWER=(PI/2.0D0)-DATAN(X/DSQRT(1.0D0-X*X))
         RETURN
C-----X GT ONE OR X LT ONE-----
40      X=1.0D0
            GOTO 20
50      X=-1.0D0
            GOTO 10
          END
C
C----- ANGLE MODULO SUBROUTINE-----
C
        SUBROUTINE ANGMOD(ANGIN,ANGOUT)
        DOUBLE PRECISION ANGIN,ANGOUT,PI
C
        PI=3.141592654D0
C
        N=INT(DABS(ANGIN)/(2.0D0*PI))
C
```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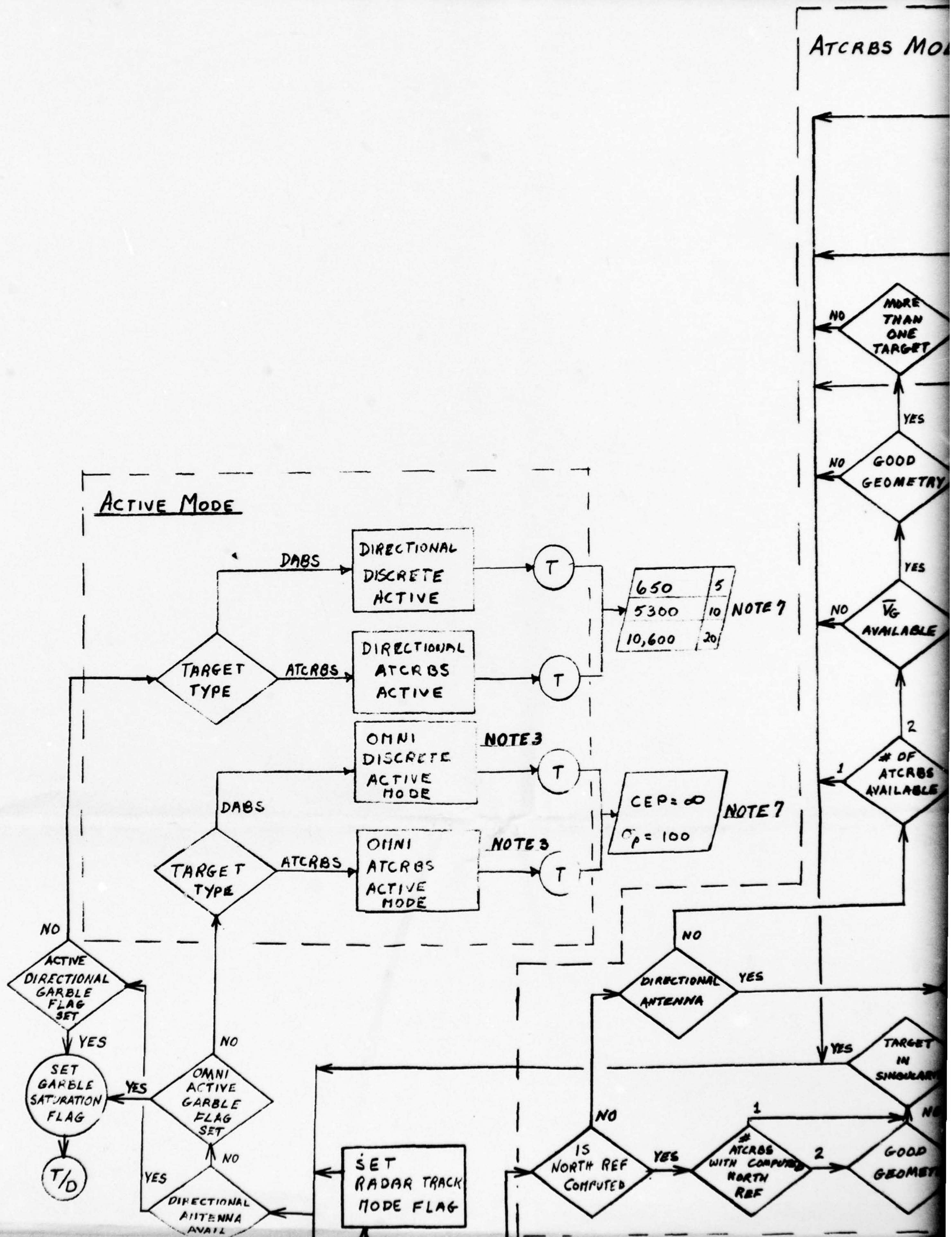
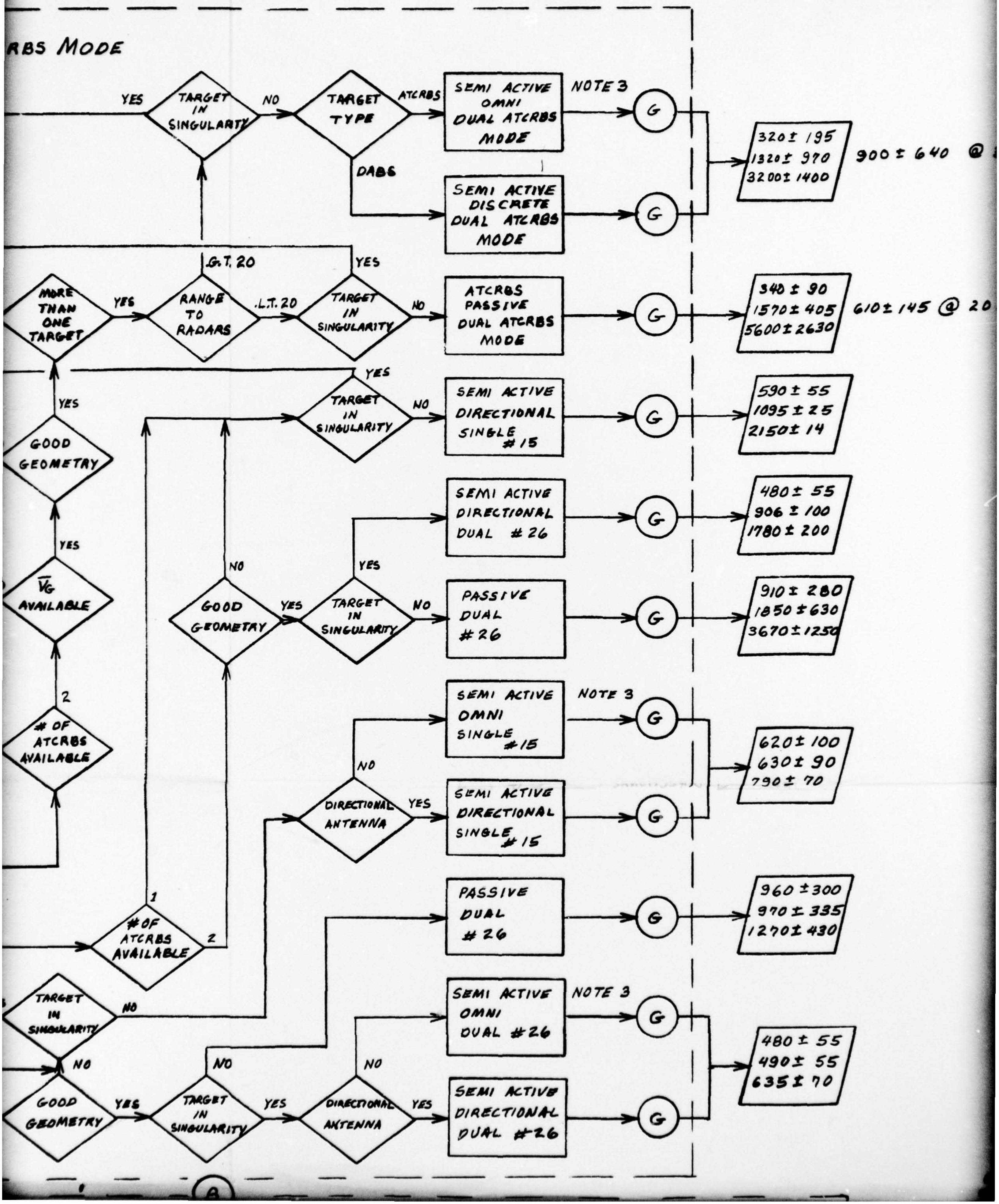


ATCRBS MODE
ACTIVE MODE
DABS
DIRECTIONAL DISCRETE ACTIVE
T
ATCRBS
DIRECTIONAL ATCRBS ACTIVE
TARGET TYPE
650 5
5300 10
10,600 20
NOTE 7
OMNI DISCRETE ACTIVE MODE
NOTE 3
OMNI ATCRBS ACTIVE MODE
CEP = ∞
σp = 100
MORE THAN ONE TARGET
GOOD GEOMETRY
V̄G AVAILABLE
OF ATCRBS AVAILABLE
YES
NO
ACTIVE DIRECTIONAL GARBLE FLAG SET
SET GARBLE SATURATION FLAG
T/D
OMNI ACTIVE GARBLE FLAG SET
DIRECTIONAL ANTENNA AVAIL
SET RADAR TRACK MODE FLAG
DIRECTIONAL ANTENNA
IS NORTH REF COMPUTED
ATCRBS WITH COMPUTED NORTH REF
TARGET IN SINGULARITY

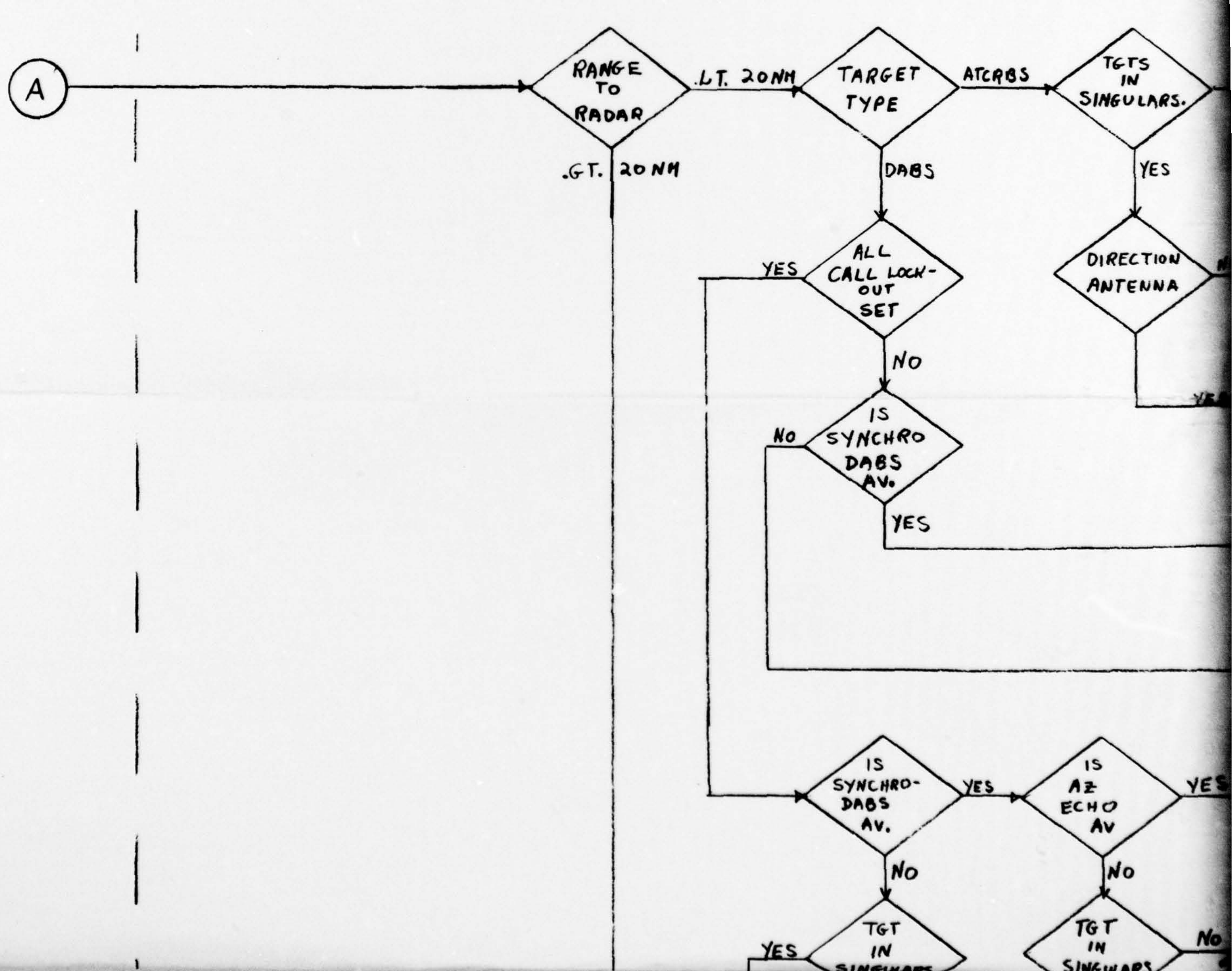


RBS MODE
YES
TARGET IN SINGULARITY
NO
TARGET TYPE
ATCRBS
DABS
SEMI ACTIVE OMNI DUAL ATCRBS MODE
NOTE 3
SEMI ACTIVE DISCRETE DUAL ATCRBS MODE
G
320 ± 195
1320 ± 970
3200 ± 1400
900 ± 640 @
MORE THAN ONE TARGET
RANGE TO RADARS
G.T. 20
L.T. 20
ATCRBS PASSIVE DUAL ATCRBS MODE
340 ± 90
1570 ± 405
5600 ± 2630
610 ± 145 @ 20
GOOD GEOMETRY
SEMI ACTIVE DIRECTIONAL SINGLE #15
590 ± 55
1095 ± 25
2150 ± 14
SEMI ACTIVE DIRECTIONAL DUAL #26
480 ± 55
906 ± 100
1780 ± 200
$\overline{V}G$ AVAILABLE
PASSIVE DUAL #26
910 ± 280
1850 ± 630
3670 ± 1250
OF ATCRBS AVAILABLE
2
SEMI ACTIVE OMNI SINGLE #15
DIRECTIONAL ANTENNA
SEMI ACTIVE DIRECTIONAL SINGLE #15
620 ± 100
630 ± 90
790 ± 70
1
PASSIVE DUAL #26
960 ± 300
970 ± 335
1270 ± 430
SEMI ACTIVE OMNI DUAL #26
SEMI ACTIVE DIRECTIONAL DUAL #26
480 ± 55
490 ± 55
635 ± 70
B

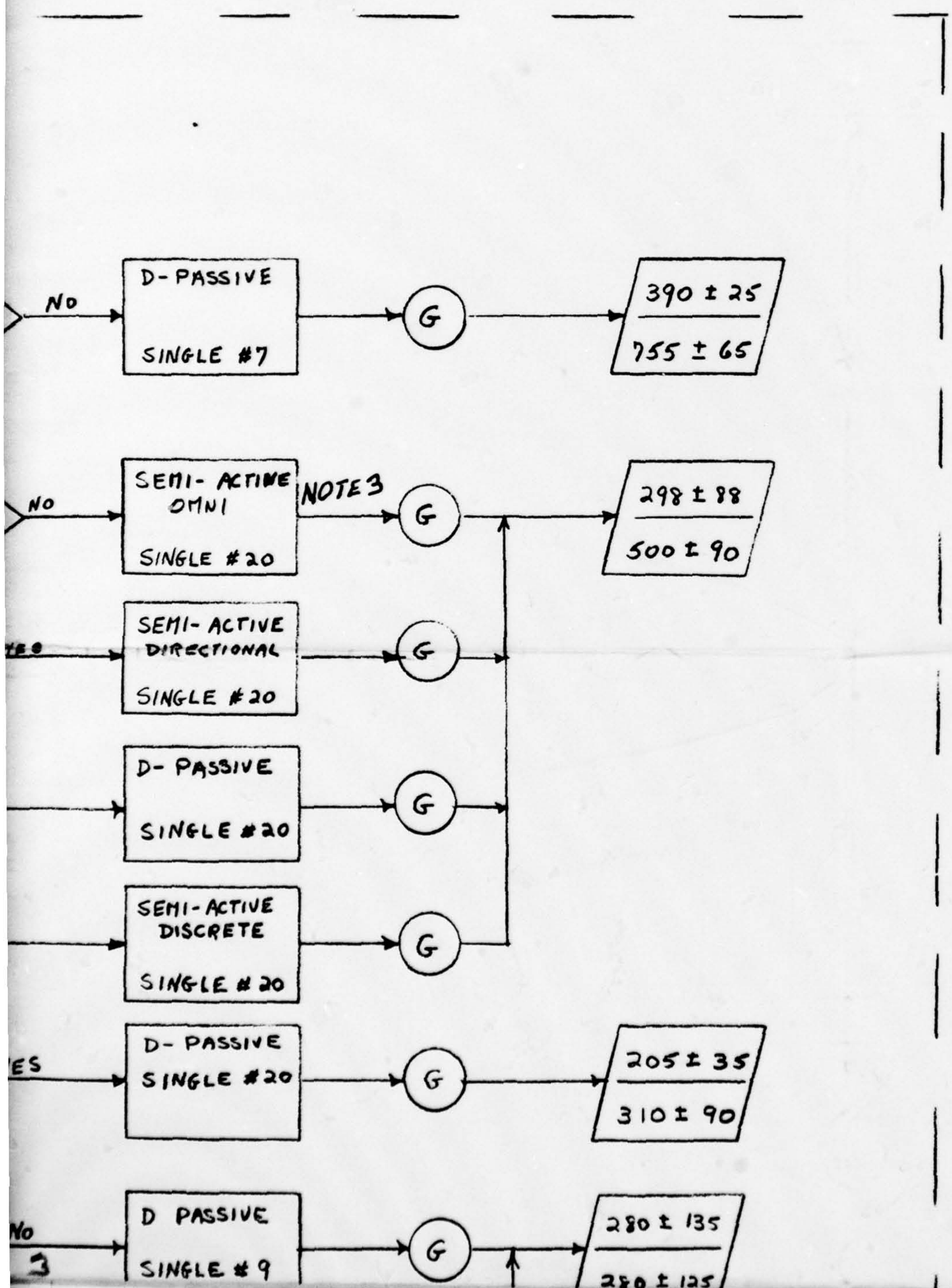
@ 35 mm

20 mm

SINGLE SITE DABS MODE



2



NOTE 1: PWI IS ON
BEARING IS
ACTIVE MOD

NOTE 2: SIMPLIFICAT
OCCURS IF
LOCKOUT

NOTE 3: ALL SEMI
HIGH DENS
DIRECTIO

NOTE 4: THE DIREC

NOTE 5: AN RBX IS
BY DABS

NOTE 6: R-PASSIVE

NOTE 7: THIS GEO

NOTES

ONLY PROTECTION AGAINST PROXIMATE (1 NM) AIRCRAFT -

IS REQUIRED FOR PROTECTION AND CANNOT BE PROVIDED IN THE MODE WITHOUT A DIRECTIONAL ANTENNA

FICATION AND ACCURACY IMPROVEMENT IN THE SINGLE SITE DABS MODE IF SYNCHRO-DABS W. AZ. ECHO IS REQUIRED WHENEVER THE ALL CALL UT BIT IS SET IN DABS

SEMI-ACTIVE OMNI MODES AND ACTIVE OMNI MODES WILL SATURATE IN DENSITY AIRSPACE AND NO PROTECTION IS PROVIDED UNLESS A CTIONAL ANTENNA IS AVAILABLE

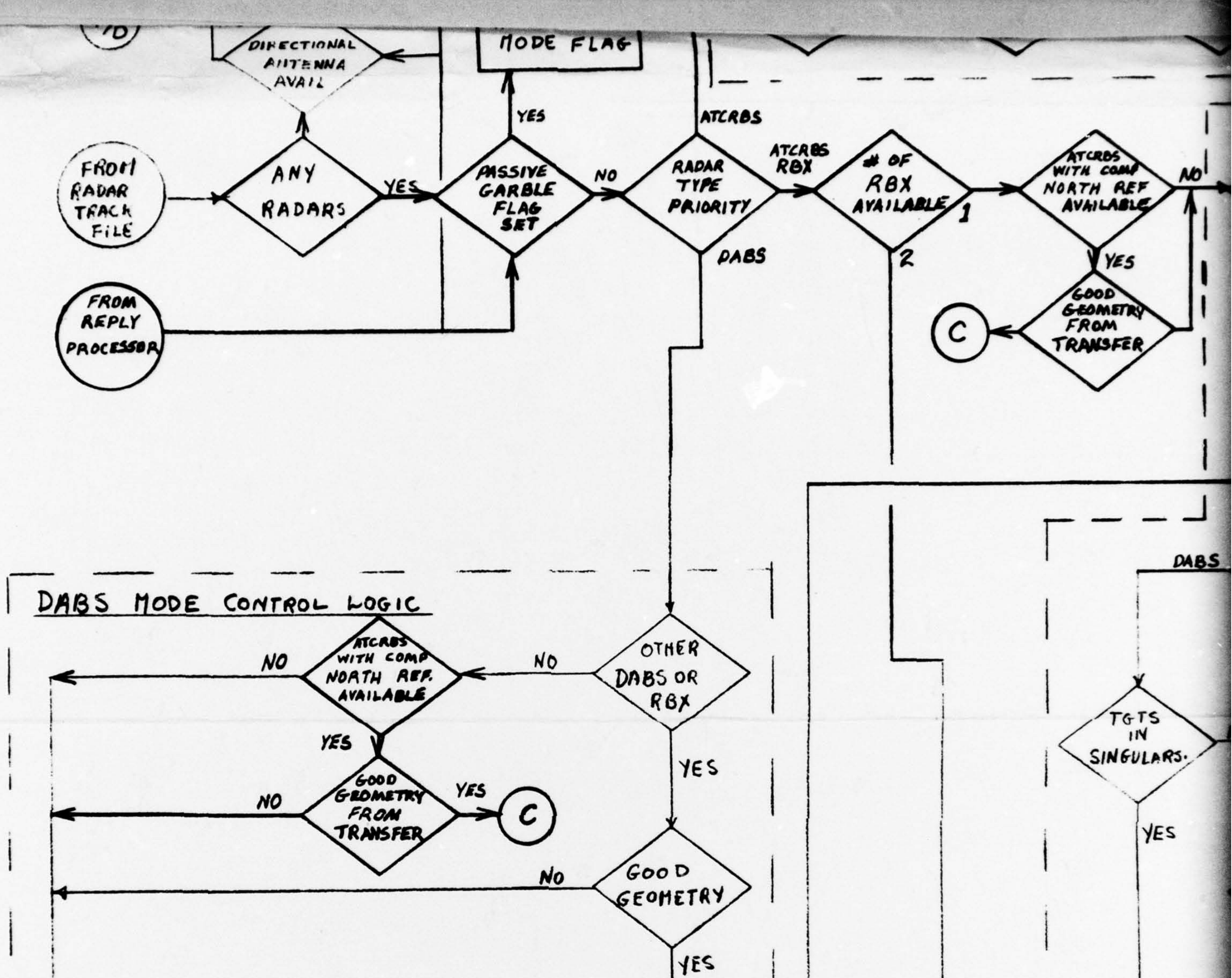
DIRECTIONAL ANTENNA CAN BE USED TO REDUCE PASSIVE GARBLE

X IS NOT REQUIRED AT DABS IF RANGE & AZIMUTH ARE BROADCASTED BS

SIVE REQUIRES LOW PRF INTERROGATION OF THE RBX

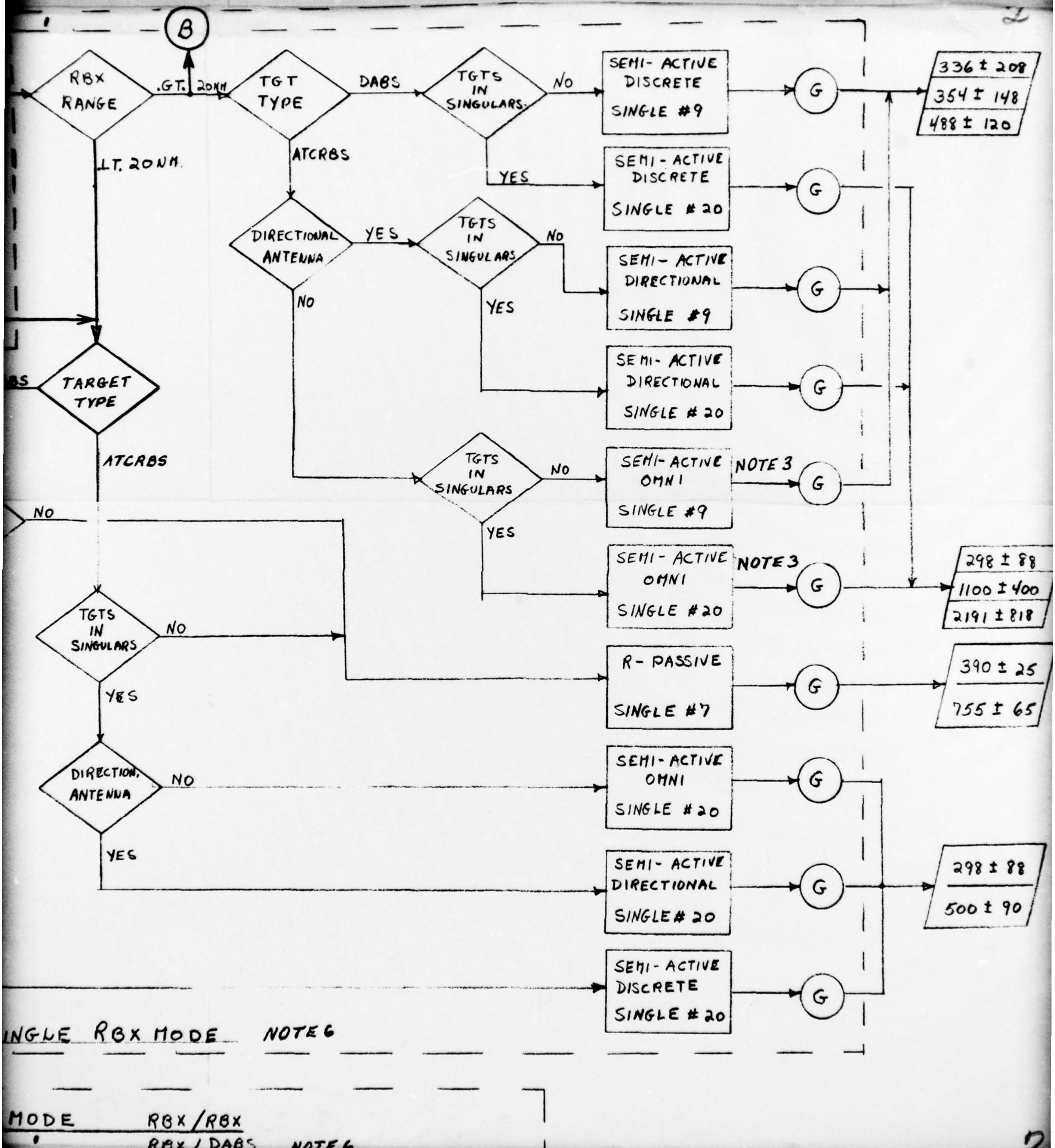
GEOMETRIC RECONSTRUCTION DOES NOT MEET REQUIRED ACCURACY

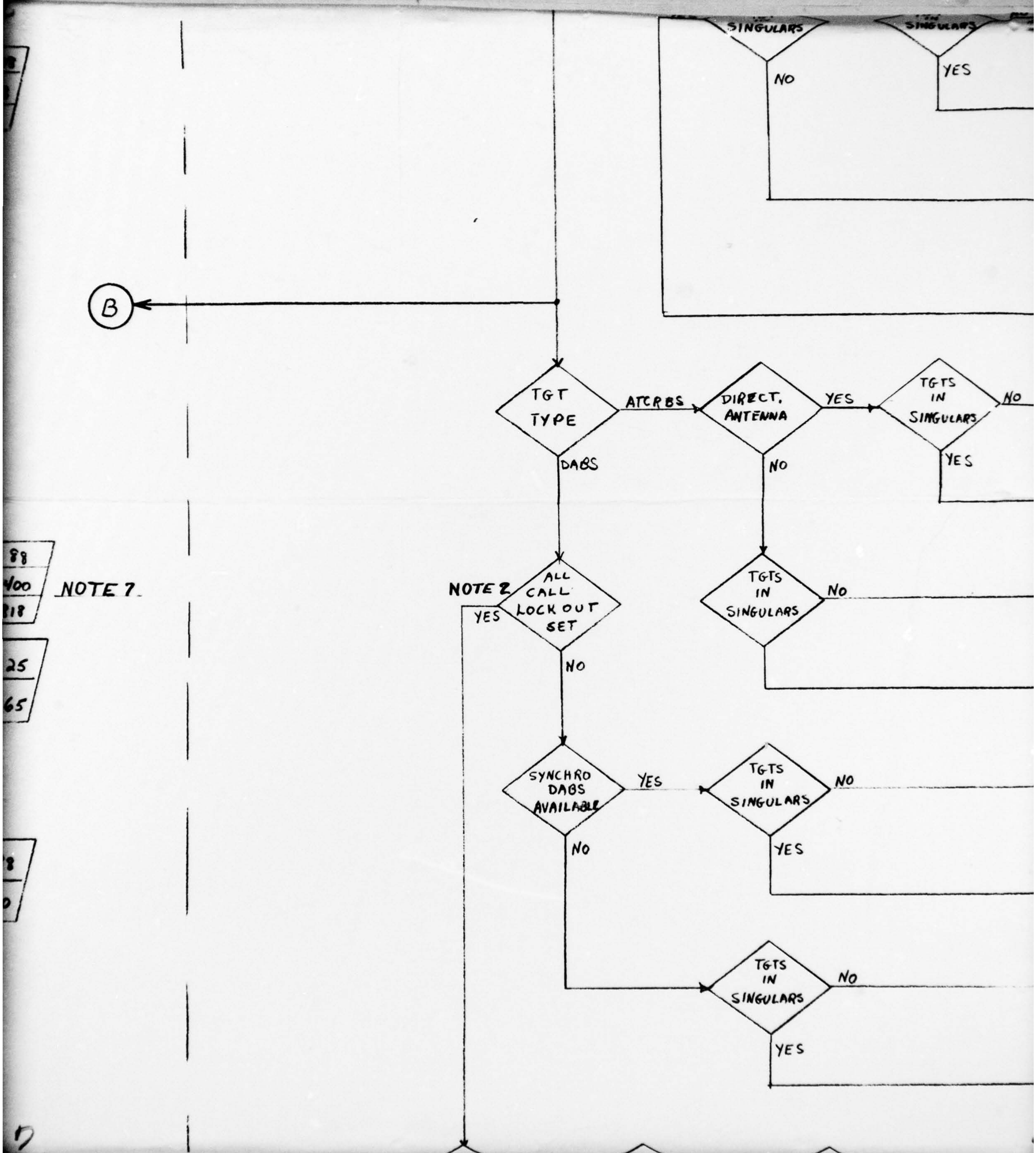
1

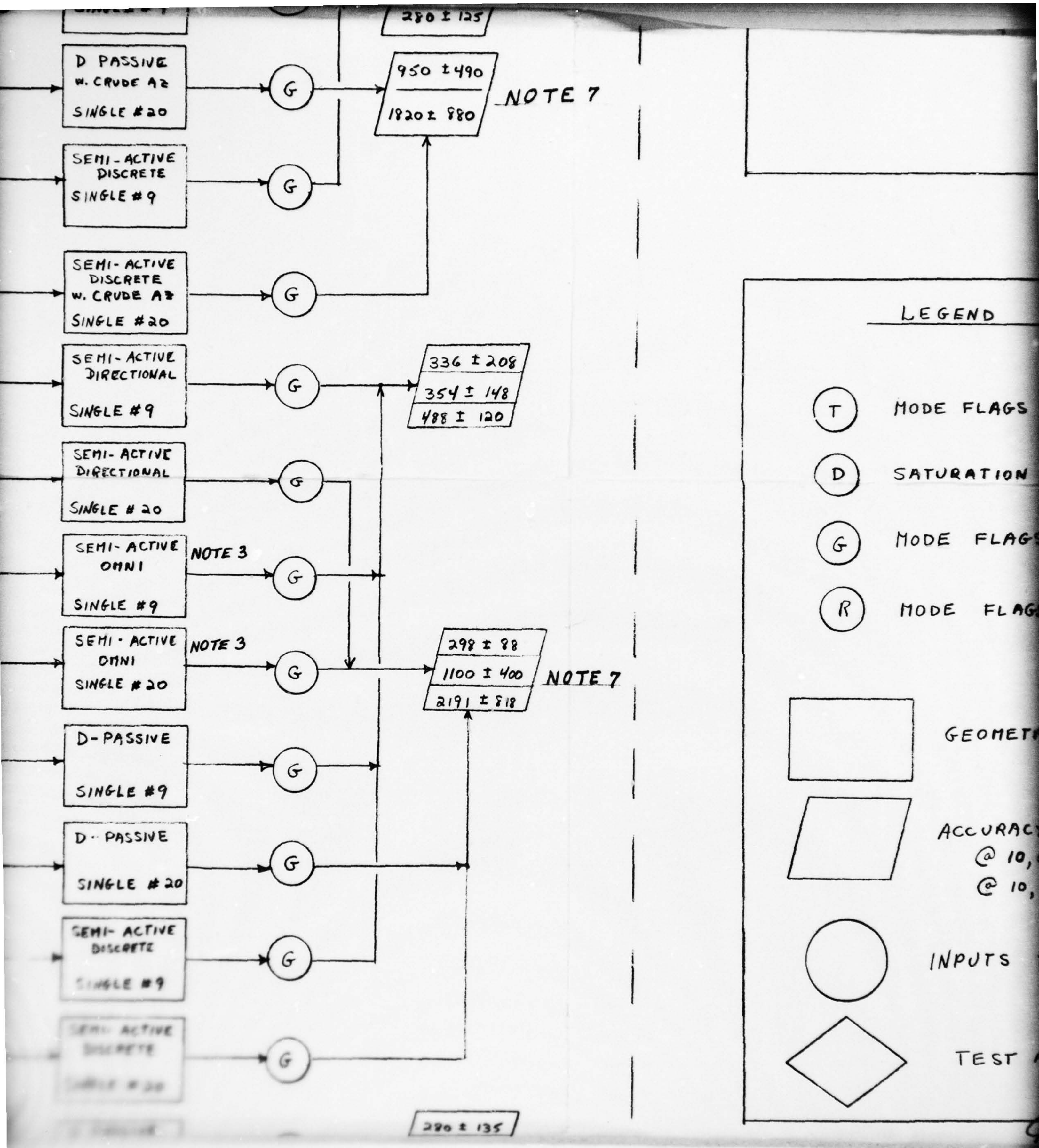


DIRECTIONAL ANTENNA AVAIL
MODE FLAG
YES
ATCRBS
FROM RADAR TRACK FILE
ANY RADARS
YES
PASSIVE GARBLE FLAG SET
NO
RADAR TYPE PRIORITY
ATCRBS RBX
OF RBX AVAILABLE
1
2
ATCRBS WITH COMP NORTH REF AVAILABLE
NO
YES
GOOD GEOMETRY FROM TRANSFER
C
DABS
FROM REPLY PROCESSOR
DABS MODE CONTROL LOGIC
NO
ATCRBS WITH COMP NORTH REF. AVAILABLE
NO
OTHER DABS OR RBX
YES
YES
NO
GOOD GEOMETRY FROM TRANSFER
YES
C
NO
GOOD GEOMETRY
YES
DABS
TARGET TYPE
ATCRBS
YES
IS ATCRBS LOCKOUT SET
NO
YES
IS ALL CALL LOCKOUT SET
NO
NO
IS TGT
NO
IS OTHER
DABS
TGTS IN SINGULARS.
YES
SIN
DUAL M

6


B
RBX RANGE
.GT. 20NM
.LT. 20NM
TGT TYPE
DABS
ATCRBS
TGTS IN SINGULARS
NO
YES
SEMI-ACTIVE DISCRETE SINGLE #9
SEMI-ACTIVE DISCRETE SINGLE #20
DIRECTIONAL ANTENNA
SEMI-ACTIVE DIRECTIONAL SINGLE #9
SEMI-ACTIVE DIRECTIONAL SINGLE #20
SEMI-ACTIVE OMNI SINGLE #9
SEMI-ACTIVE OMNI SINGLE #20
NOTE 3
G
336 ± 208
354 ± 148
488 ± 120
298 ± 88
1100 ± 400
2191 ± 818
TARGET TYPE
R-PASSIVE SINGLE #7
390 ± 25
755 ± 65
DIRECTION. ANTENNA
SEMI-ACTIVE OMNI SINGLE #20
SEMI-ACTIVE DIRECTIONAL SINGLE #20
SEMI-ACTIVE DISCRETE SINGLE #20
298 ± 88
500 ± 90
INGLE RBX MODE NOTE 6
MODE RBX/RBX
RBX/DABS NOTE 6


SINGULARS
NO
SINGULARS
YES
B
TGT TYPE
ATCRBS
DIRECT. ANTENNA
YES
TGTS IN SINGULARS
NO
YES
DABS
NO
88
400
218
NOTE 7
NOTE 2
ALL CALL LOCK OUT SET
YES
TGTS IN SINGULARS
NO
25
65
NO
SYNCHRO DABS AVAILABLE
YES
TGTS IN SINGULARS
NO
YES
NO
TGTS IN SINGULARS
NO
YES


280 ± 125
D PASSIVE
W. CRUDE AZ
SINGLE #20
G
950 ± 490
1820 ± 880
NOTE 7
SEMI-ACTIVE
DISCRETE
SINGLE #9
SEMI-ACTIVE
DISCRETE
W. CRUDE AZ
SINGLE #20
SEMI-ACTIVE
DIRECTIONAL
SINGLE #9
336 ± 208
354 ± 148
488 ± 120
SEMI-ACTIVE
DIRECTIONAL
SINGLE # 20
SEMI-ACTIVE
OMNI
SINGLE #9
NOTE 3
SEMI-ACTIVE
OMNI
SINGLE # 20
NOTE 3
298 ± 88
1100 ± 400
2191 ± 818
NOTE 7
D-PASSIVE
SINGLE #9
D-PASSIVE
SINGLE # 20
SEMI-ACTIVE
DISCRETE
SINGLE #9
280 ± 135
LEGEND
T
MODE FLAGS
D
SATURATION
G
MODE FLAGS
R
MODE FLAGS
GEOMETR
ACCURACY
@ 10,
@ 10,
INPUTS
TEST

S AND DATA TO TARGET TRACKER

N FLAG TO RESOLUTION LOGIC AND DISPLAY

GS AND DATA TO GEOMETRIC RECONSTRUCTION

IGS AND DATA TO RADAR SELECTION AND TRACKING

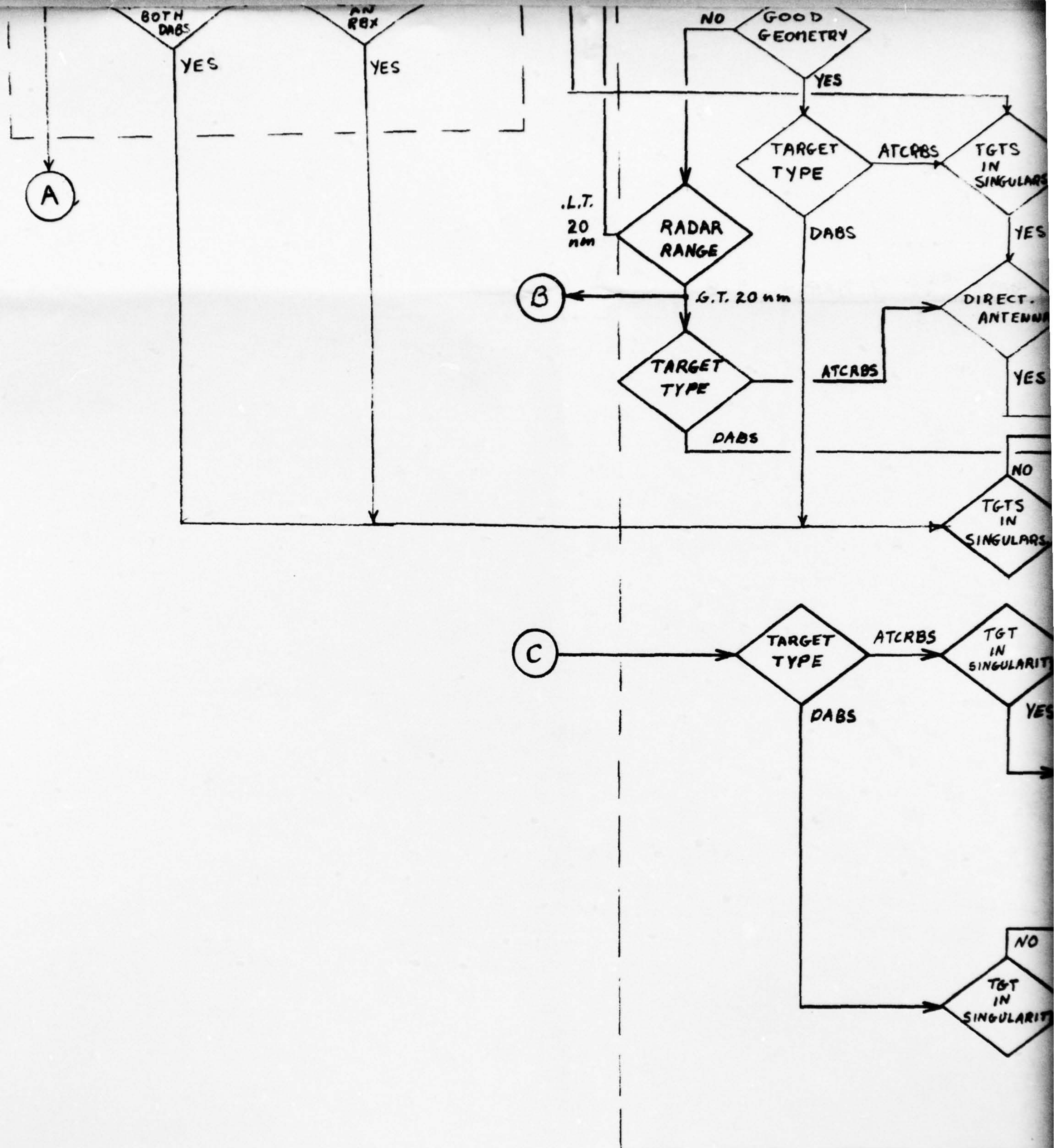
TRIC RECONSTRUCTION MODE

CY OF GEOMETRIC RECONSTRUCTION
,50,100 NM FROM RADARS OR
,20 NM FROM RADAR

TO MODE SELECTION AND CONTROL

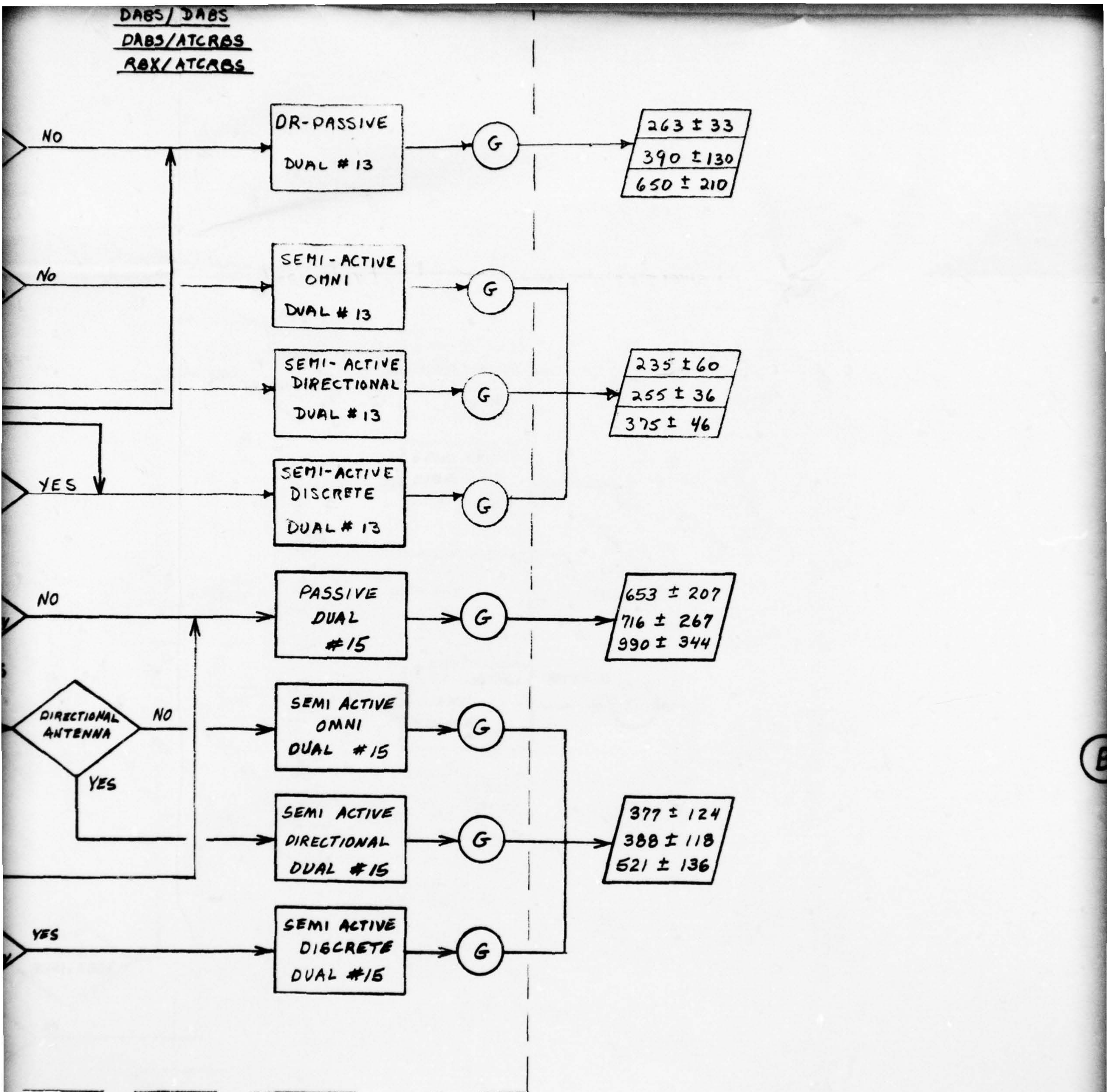
AND BRANCH

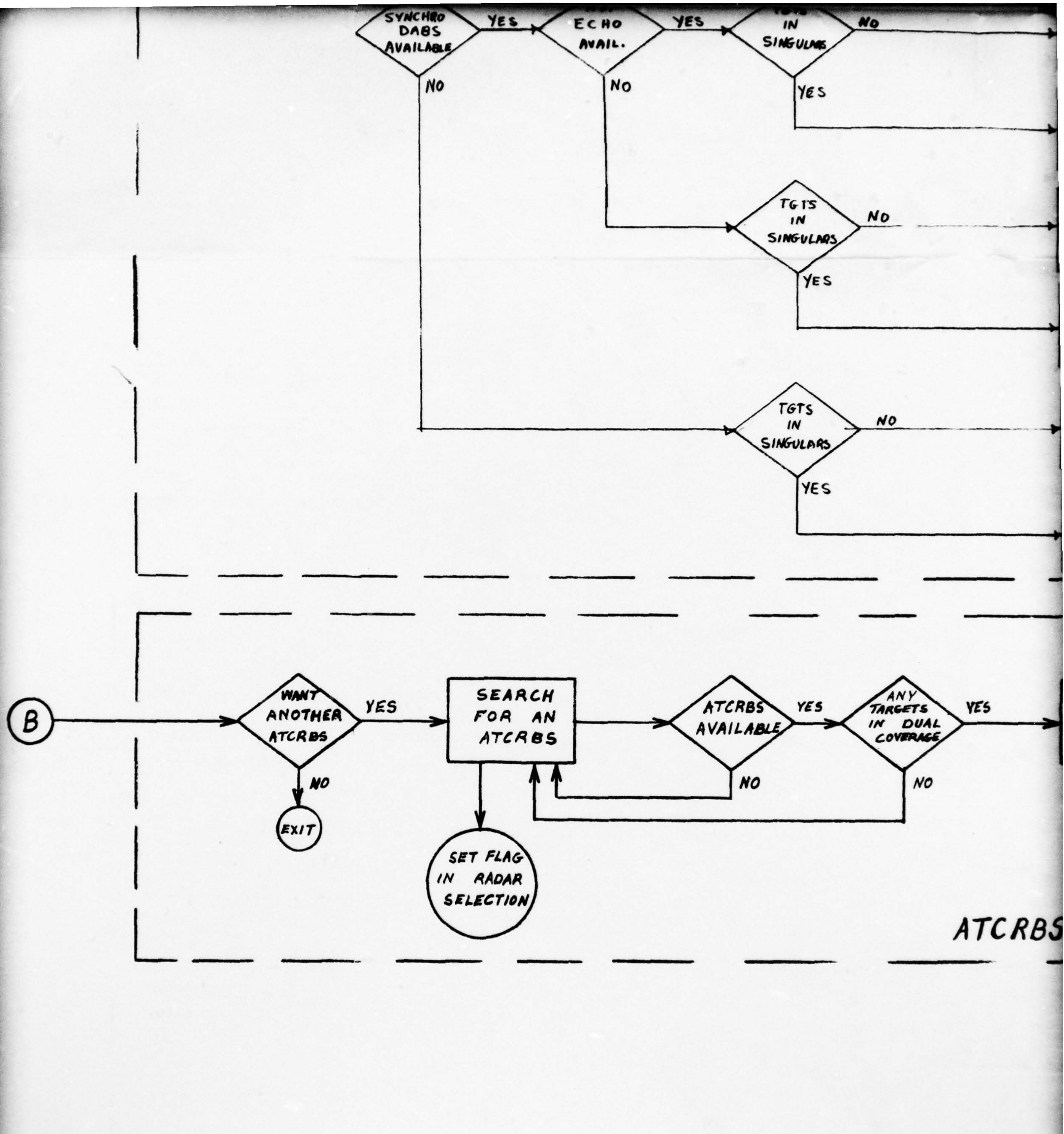
10



BOTH DABS
YES
RBX
YES
A
NO
GOOD GEOMETRY
YES
TARGET TYPE
ATCRBS
TGTS IN SINGULARS
YES
.L.T. 20 nm
RADAR RANGE
DABS
B
G.T. 20 nm
DIRECT. ANTENNA
TARGET TYPE
ATCRBS
YES
DABS
NO
TGTS IN SINGULARS
C
TARGET TYPE
ATCRBS
TGT IN SINGULARITY
DABS
YES
NO
TGT IN SINGULARITY

11


DABS/DABS
DABS/ATCRBS
RBX/ATCRBS
NO
OR-PASSIVE DUAL #13
263 ± 33
390 ± 130
650 ± 210
NO
SEMI-ACTIVE OMNI DUAL #13
SEMI-ACTIVE DIRECTIONAL DUAL #13
235 ± 60
255 ± 36
375 ± 46
YES
SEMI-ACTIVE DISCRETE DUAL #13
NO
PASSIVE DUAL #15
653 ± 207
716 ± 267
990 ± 344
DIRECTIONAL ANTENNA
NO
YES
SEMI ACTIVE OMNI DUAL #15
SEMI ACTIVE DIRECTIONAL DUAL #15
377 ± 124
388 ± 118
521 ± 136
YES
SEMI ACTIVE DISCRETE DUAL #15
G


SYNCHRO DABS AVAILABLE
YES
NO
ECHO AVAIL.
YES
NO
IN SINGULARS
NO
YES
TGTS IN SINGULARS
NO
YES
TGTS IN SINGULARS
NO
YES
B
WANT ANOTHER ATCRBS
YES
NO
EXIT
SEARCH FOR AN ATCRBS
SET FLAG IN RADAR SELECTION
ATCRBS AVAILABLE
YES
NO
ANY TARGETS IN DUAL COVERAGE
YES
NO
ATCRBS

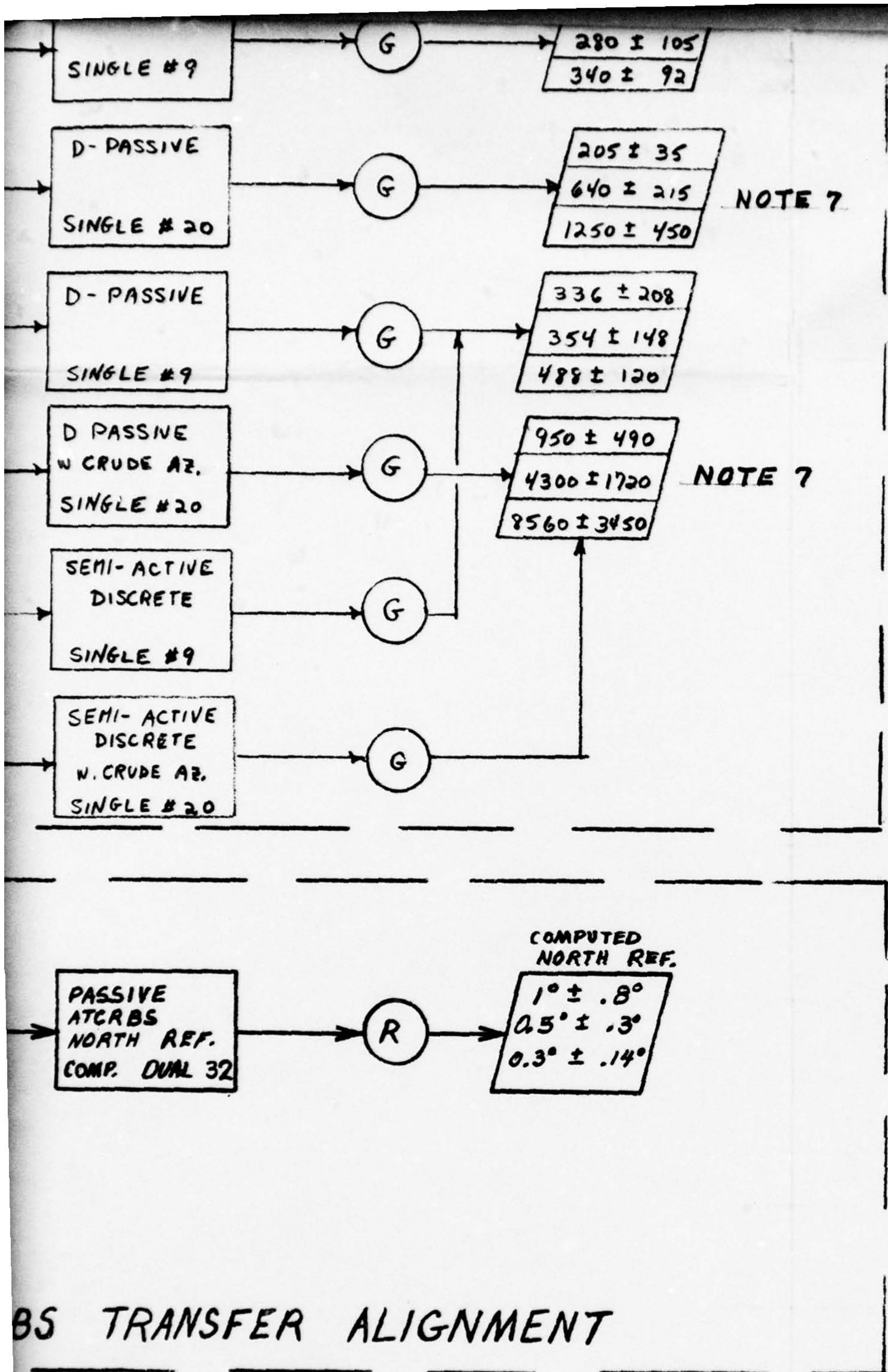


FIGURE B-1

TITLE: BCAS MODE S

DATE: 9 MARCH, 1978

REV. #	REVISION DESC
1	ADD NOTES TO FL
2	DIRECTIONAL ACT
3	ATCRBS TRANSFER
4	DUAL MODE ADD
5	1030/1090 SIGNAL P

SELECTION AND CONTROL LOGIC (DETAILED FLOW)

B

ESCRIPTION		DATE
FLOW CHART	PVH	3-9-78
CTIVE GARBLE DETAIL & ATCRBS MODE	PVH	3-20-78
ER ALIGNMENT	PVH	3-28-78
ADDED DUAL #15 AND BRANCHES TO ©	PVH	3-30-78
L PROCESSORS REPLACED BY REPLY PROCESSOR	PVH	4-03-78

ORIGINAL DRAWN BY: EJK

14, 15